AMERICAN ARTISAN

JULY
1941

RESIDENTIAL AIR CONDITIONING
WARM AIR HEATING • SHEET METAL CONTRACTING

ESTABLISHED
1880

LAMNECK

AIDS DEFENSE BY SAVING

with Lamneck Prefabricated Duct and Fittings

MAN POWER

with Lamneck Gravity Pipe and Fittings

MONEY

with Lamneck Registers

TIME

with Lamneck Service

YOUR DISTRIBUTOR

Carrying as he does ample stocks to supply your needs, gives you every benefit of our varied line, volume production and engineering experience. Talk to your Lamneck distributor. He will show you how to save days and hours on every job.

LP INC.

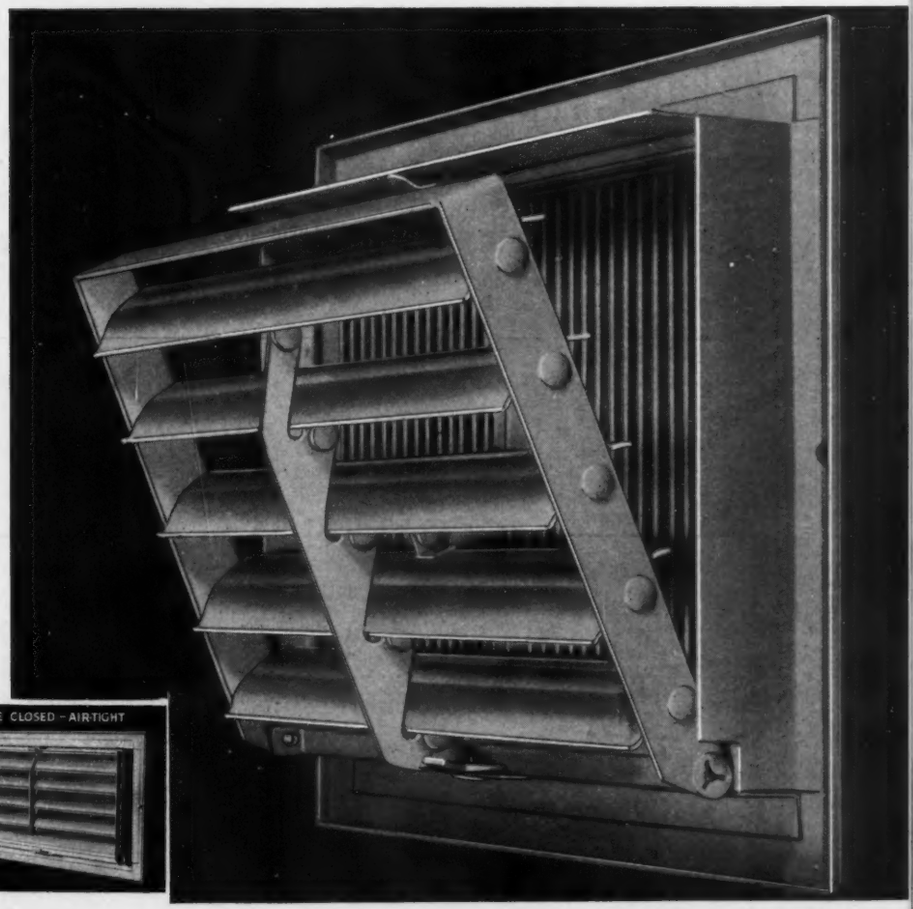
Specify LAMNECK

LAMNECK PRODUCTS, INC., Middletown, Ohio

USE H&C REGISTERS with the INCOMPARABLE TURNING BLADE VALVE

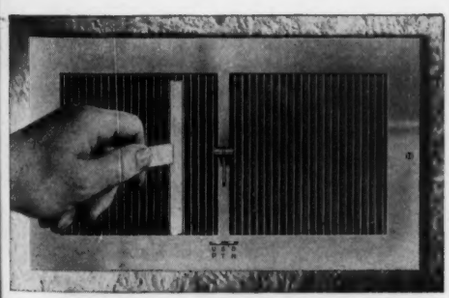
TS200
.A7

It's the Cheapest and Best Good Will Builder in the Air Conditioning Business



The TURNING BLADE VALVE, used in H & C Nos. 75 and 86 Registers, is the only directional valve which when open extends back the full depth of the duct, smoothly dividing and turning every bit of the air flow with equal velocity to every portion of the register face. The result is less turbulence, less resistance and better distribution to the farthest parts of the room.

Closed, the turning blade valve is air-tight. To adjust the blades to UP, STRAIGHT, or DOWN requires just a turn of the regulator at the front of the register as shown at left.



The H & C No. 75 Design incorporates both the Turning Blade Valve and quick adjustability to any sideway deflection desired. Sideway deflections are quickly obtained by simply twisting the flexible fins with wrench furnished with each item.

Many a contractor, accustomed to selecting his registers chiefly on the basis of lowest price, has come to learn that it's far better business to use H & C Registers with the incomparable TURNING BLADE VALVE on practically all of his jobs.

The reason is simple. RESULTS ARE UNIFORMLY BETTER! Distribution is more even, cold spots and "draft sensations" are eliminated, the customer obtains the maximum of comfort; and that's what COUNTS! Thoroughly satisfied customers are enthusiastic customers and will do more to help you get new business than any other single factor you could employ.

Try using H & C Registers with the TURNING BLADE VALVE on your next few jobs. You'll find that the relatively small cost differential between them and the most inexpensive registers available, is the cheapest and best good-will builder in the air conditioning business.

Though definitely superior in performance, H & C Registers with the Turning Blade Valve cost no more than registers with ordinary multi-shutter valves.

Current Catalogs: No. 41 (Gravity Registers) and No. 41AC (Air Conditioning Registers). If not on hand write us.

HART & COOLEY MANUFACTURING CO.

Warm Air Registers · Air Conditioning Grilles · Damper Regulator Sets · Dampers · Chain · Pulleys

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Chicago Office: 61 W. Kinzie St. Philadelphia Office: 1600 Arch St.

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AMERICAN ARTISAN

WITH WHICH ARE MERGED

FURNACES AND SHEET METALS

AND

Warm-Air Heating

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

J. D. Wilder, Editor — A. A. Kennedy, Assistant Editor

Vol. 110, No. 7 — July, 1941 — Founded 1880

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In This Issue

THIS month's cover is surely typical of the intensive training now being given young men all over the country in practically every trade at all related to manufacture for rearmament. The United States Steel Corporation supplied the photograph with the note that this organization has 15,000 employees undergoing intensive training.

●

In connection with this problem of training, we again call attention to the series of articles by Ernest Zideck (page 73) in which a "streamlined" training in sheet metal work, planned specifically for today's need for machine operators and not all-around mechanics, is being proposed.

●

The cost figures showing the saving secured by welding in place of riveting, soldering and casting for a dish washing machine (page 65) should be of particular interest to fabricators making similar items. The study clearly indicates that some redesigning for welding is necessary if the ultimate saving is to be secured.

●

Again, the Residential Air Conditioning Section features articles on cooling. Of especial interest should be F. O. Jordan's proven short form for calculating the cooling load, page 46. As the author points out engineering time and expense must be minimized if sales are to be made rapidly and while the prospect is "hot." The bullion cube cooling system shows the definite benefits of cooling (page 43) in reducing time lost and materials wasted.

●

And we should like to call especial attention to the Vorys Brothers short Technical Code method on page 49. Readers looking for short engineering methods will find this code a time and trouble saver and very practical.

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More than 8,000 copies of this issue are being distributed

Publisher's bind

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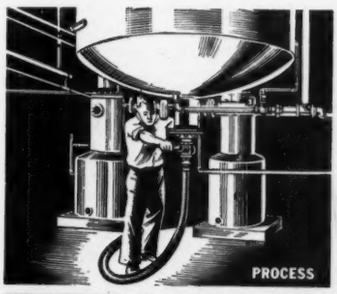
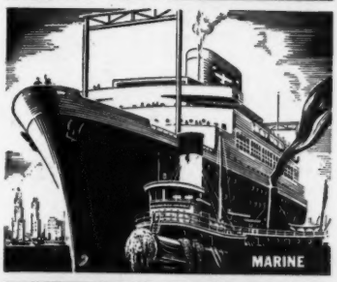
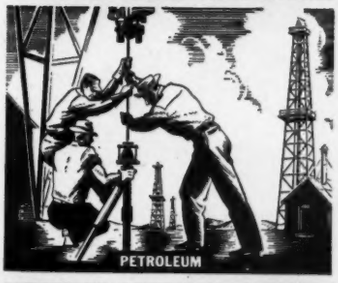
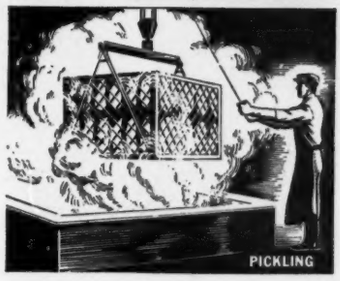
PARTNERS FOR THE EMERGENCY . . !









IN the industries illustrated, and scores of others, INCO Nickel Alloys have long been used for vital parts of equipment. Strong, tough, resistant to heat, corrosion and wear, these metals assure trouble-free performance, and long, economical life. As a result, INCO Nickel Alloys are now in urgent demand . . . working with former peace-time industries as "Partners For The Emergency."

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FOOD: Monel and Pure Nickel equipment used in grading, preparing, cooking and canning food for the armed forces.

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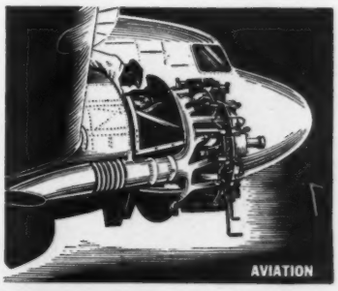

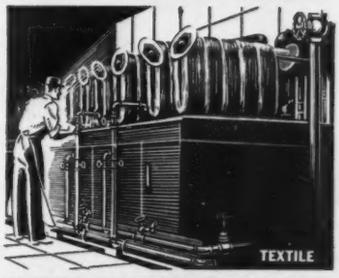

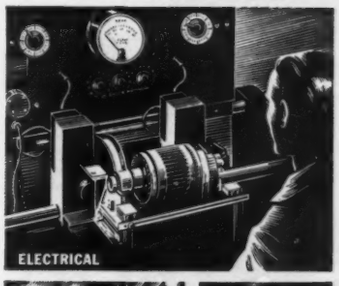

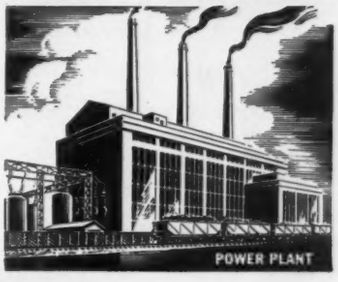

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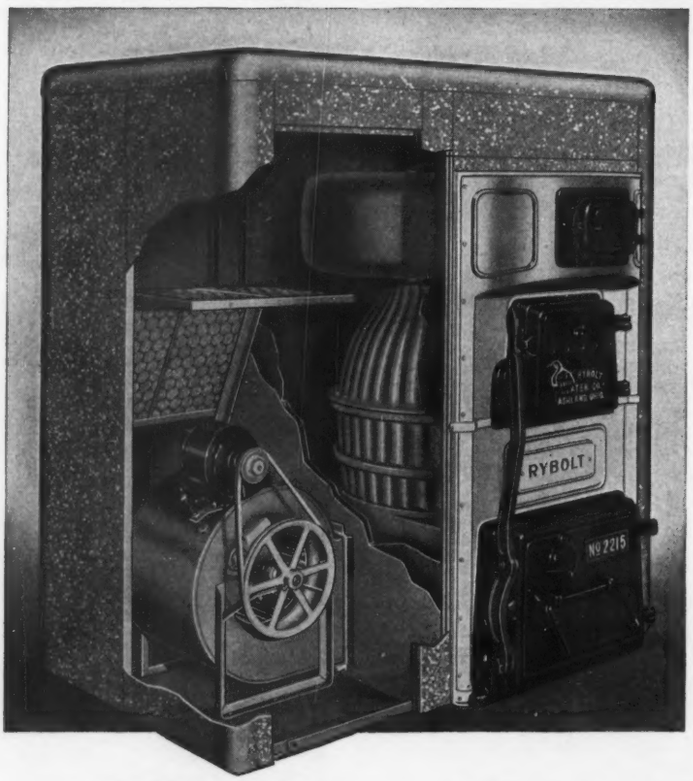
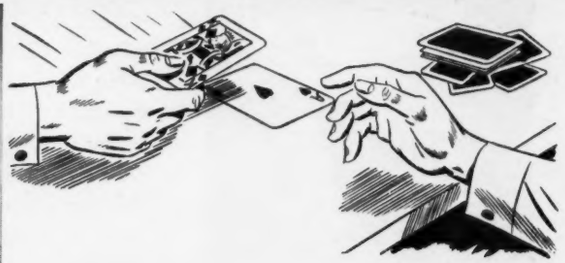
RYBOLT





HERE'S WHERE YOU TRUMP YOUR COMPETITOR'S ACE

In the stiff game of selling automatic heating you have the trump card with RYBOLT Series 151 Cast Iron Coal-Fired Winter Air Conditioner. Redesigned and refined to meet today's exacting requirements, Series 151 will win trick after trick for you against the toughest competition where quality and performance count.

RYBOLT Series 151—WINTER AIR CONDITIONER—*Cast Iron Coal-Fired*

Redesigned and thoroughly modernized, Series 151 represents a new high in operating efficiency, convenience and economy. Has the well known RYBOLT Series 15 Coal-Fired Furnace for its heating element. Special new features include the full height reversible blower cabinet which can be placed on either side of the unit. A high quality automatic heating unit throughout. Compact and attractive. Casing is handsomely finished in smooth gray Hammerloid enamel. Inner casing baffles. Standard equipment includes blower with top-mounted motor and variable speed pulley, thermostatic blower switch and Dust-Stop filters. Comes in 4 sizes.

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WRITE FOR *set of folders covering the complete RYBOLT line of Winter Air Conditioners and Warm Air Furnaces.*

THE RYBOLT HEATER COMPANY
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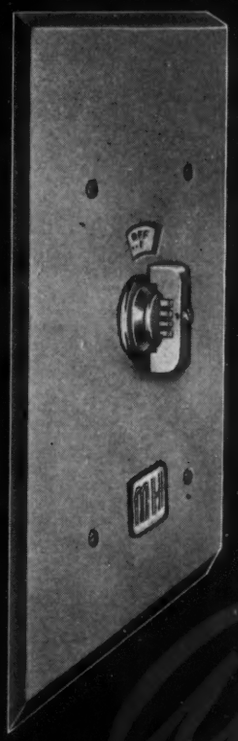


A FLUSH MOUNTED *Attic Fan Time Switch*

AT A DISTINCT PRICE ADVANTAGE

MINNEAPOLIS-HONEYWELL IS *Selling* AUTOMATIC HEATING FOR YOU WITH 677,000,000 MAGAZINE *and* BILLBOARD MESSAGES

HERE is a flush mounted line voltage timing device to control the operation of attic fans. Its features include a non-magnetic snap switch, convenient means of installation, simple setting mechanism and an exceptionally attractive price. This time switch can also be used to control store lights or other electrical equipment where the current supply is to be turned on or off for some pre-determined interval of time. A twist of the fingers sets the timer for any period of time from one-half hour to eleven hours while a twist of the knob in the opposite direction will turn off (or on) the current supply at any time should this be necessary. Minneapolis-Honeywell Regulator Co., 2726 Fourth Avenue South, Minneapolis, Minn. Canadian Office: Toronto, Ontario. European Office: London, England . . . Company owned branches in forty-nine cities.

Electrical Ratings: 10 amps. at 115 volts, 5 amps. at 230 volts. N. E. M. A. Motor Ratings at 1 H. P. A. C. at 115 volts, 1½ H.P. A.C. at 230 volts. 2 amps. at 24 volts D.C. Surface mounting type also available

MINNEAPOLIS-HONEYWELL

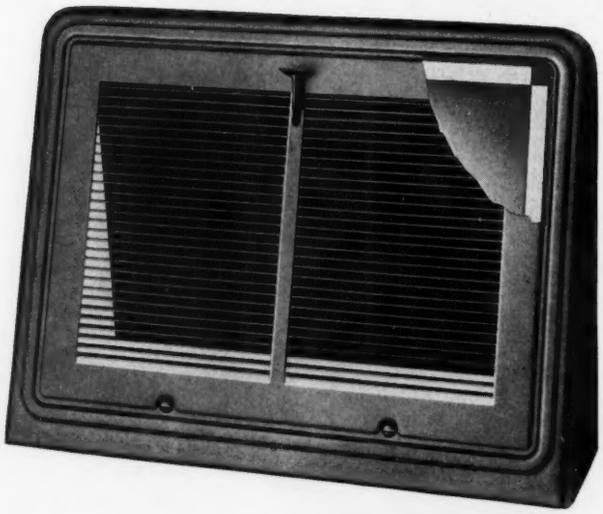
CONTROL *Systems*

DON'T MISS the INCREASED SALES within YOUR GRASP which are YOURS If You Install *U.S.* PERFECT and FINEST of All BASEBOARD Registers

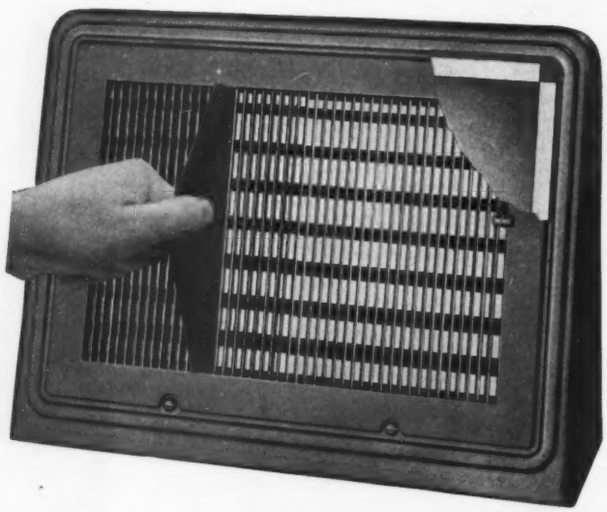
FOR GRAVITY or CONVERSION

U.S. "40" SERIES

EXCELS FOR GRAVITY INSTALLATIONS



The Straight Set Bars conceal Interior View. Two-piece construction creates PERFECT SEAL that PREVENTS LEAKAGE. LOWEST RESISTANCE—Maximum Free Area. METALAC FINISH (at Black Japan Cost) is SUPERLATIVE. 40 SERIES is definitely a Line to Stock.



U.S. "30" SERIES

EXCLUSIVELY CONVERSION

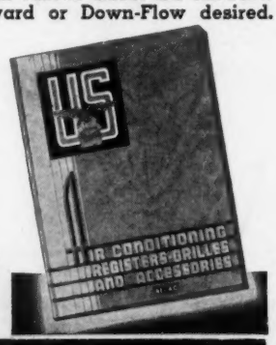
"BRAND-NEW"

The No. 30 Series U. S. BASEBOARD is Introduced and Developed by US only—Exclusively for Converting Gravity into Forced Air-Conditioned Systems without Disturbing or Replacing any Baseboard Register Boxes.

RENDERS DIRECTIONAL 4-Way AIR-FLOW. Grille bars may be set to any angle of Side-Flow. Horizontal Multiple-Back-Valves direct the Air-Flow to any Angle of Upward or Down-Flow desired.

YOU CAN "LAND" any CONVERSION JOB with the NEW No. 30 U. S. LINE

BECAUSE YOU CAN "AIR-CONDITION" the "OLD HOME" without Patching—Cutting—Redecorating. SAVES TERRIFIC EXTRA COSTS. The No. 240 U. S. Sidewall matches the No. 40 LINE. The No. 230 U. S. Sidewall matches the No. 30 LINE.



SEND for LATEST 41 A-C AIR CONDITIONING CATALOG. Request our No. 41-G GRAVITY CATALOG which will soon be available.

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CANADIAN MANUFACTURING DISTRIBUTORS—Canada Register & Grille Co., Toronto, Ontario

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General Andrew Jackson, later president of the United States, won a great victory in the battle of New Orleans, when with only 5,000 men, armed with squirrel rifles,—all infantrymen, in other words,—he vanquished the British General Pakenham's force of 10,000 veterans.

War is not as simple as that any more. Nor is heating contracting as simple as it used to be.

It is impossible to get anywhere these days with just one arm of the service. An army of infantry alone, for instance, wouldn't last a month in the field. Infantry, artillery, planes, tanks, and so on—all have their place and function.

And so, in your fight for business, you must be able to call upon many types of equipment to fill the needs of the various kinds of installations. Some people want winter air conditioning, some just warm air heating; some want cast iron construction, and others steel. And all these must be designed to burn any of three kinds of fuel.

The complete Moncrief line supplies the aggressive dealer with every requirement in his struggle for more business, more stable profits, and permanent satisfaction of customers. And the Moncrief dealer further has the advantage of handling equipment of the most modern design with all units tried and proved in service.

MONCRIEF

Cast and Steel

LONG LIFE FURNACES

Give Longer Life—Longer Profits

Square casing finished in smooth green enamel.

Both you and your customers profit more when you sell them Long Life Furnaces. The price is slightly more and the satisfaction a whole lot more—assured extra years of service that means much to the home owner. The temperature and water pan automatic controls definitely contribute to greater comfort and fuel economy.

The story of Long Life Furnaces has been one of rapid and steady sales progress. Let Long Life build bigger profits for you. Send for circulars.

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Send for our new pipe and fittings books for gravity and air conditioning installations.

Standard round galvanized casing.

Complete Line
CAST and STEEL FURNACES
WINTER AIR CONDITIONERS

Note: We would like to put you in touch with the Moncrief Jobber nearest you.

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3473 E. 49th STREET, CLEVELAND, OHIO

DO YOU KNOW HOW TO *Concentrate* FOR MORE SALES!?

Successful salesmen have learned to apply a simple rule of human psychology in the sale of automatic heating equipment. You can use the same method they do and get the same kind of results. It's a matter of selling *units,* and not *assemblies.* We call it Salvo Selling because it gathers together under one mental heading *all* of the features of the complete job. Firing equipment, controls, accessories, installation, all *pull together* to make the prospect buy.

There's a New Leader in the Control Field

Briefly, it is done by using only one brand name in your sales interview. Sell everything—controls and all—under the name of your burner. Several brand names merely confuse the prospect, delay his decision—and often kill the sale.

Perfex pioneered this conception of selling in the automatic heat field. To date, no one who has tried it has ever gone back to the old fashioned confusing method using various brand names.

PERFEX CORPORATION

500 West Oklahoma Avenue, Milwaukee, Wisconsin

FREE: THIS HANDY BOOKLET GIVING FULL DETAILS

THE NEW LINE *Luxaire*

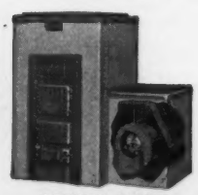
Completely RE-DESIGNED
Completely RE-BUILT

An outstanding value in quality and performance is the New Line Luxaire-Riveted and Welded Steel Gravity Furnace, which has been completely re-designed and re-built, using new patterns throughout for all cast iron parts and now available with such features as:

- New attractive streamlined fronts which are attached to the steel shell with cadmium plated bolts, extending through the fronts, making it easy to assemble.
- New, improved, duplex grates—have cast rollers which cannot become dislodged or clogged.
- New, sturdy, upright shaker handles with new, substantial grate connecting rod.
- New tight fitting connecting collars.
- Improved brick clamps.
- New, streamlined, feed and ashpit doors machined in our plant to a perfect fit.

SERIES 600
Available in six sizes.

SERIES 700
Coal Burning Hand Fired Gravity Furnace. Available in Stoker models.



SERIES AC 700
Coal Burning Hand Fired Air Conditioning Unit, available in Stoker models.

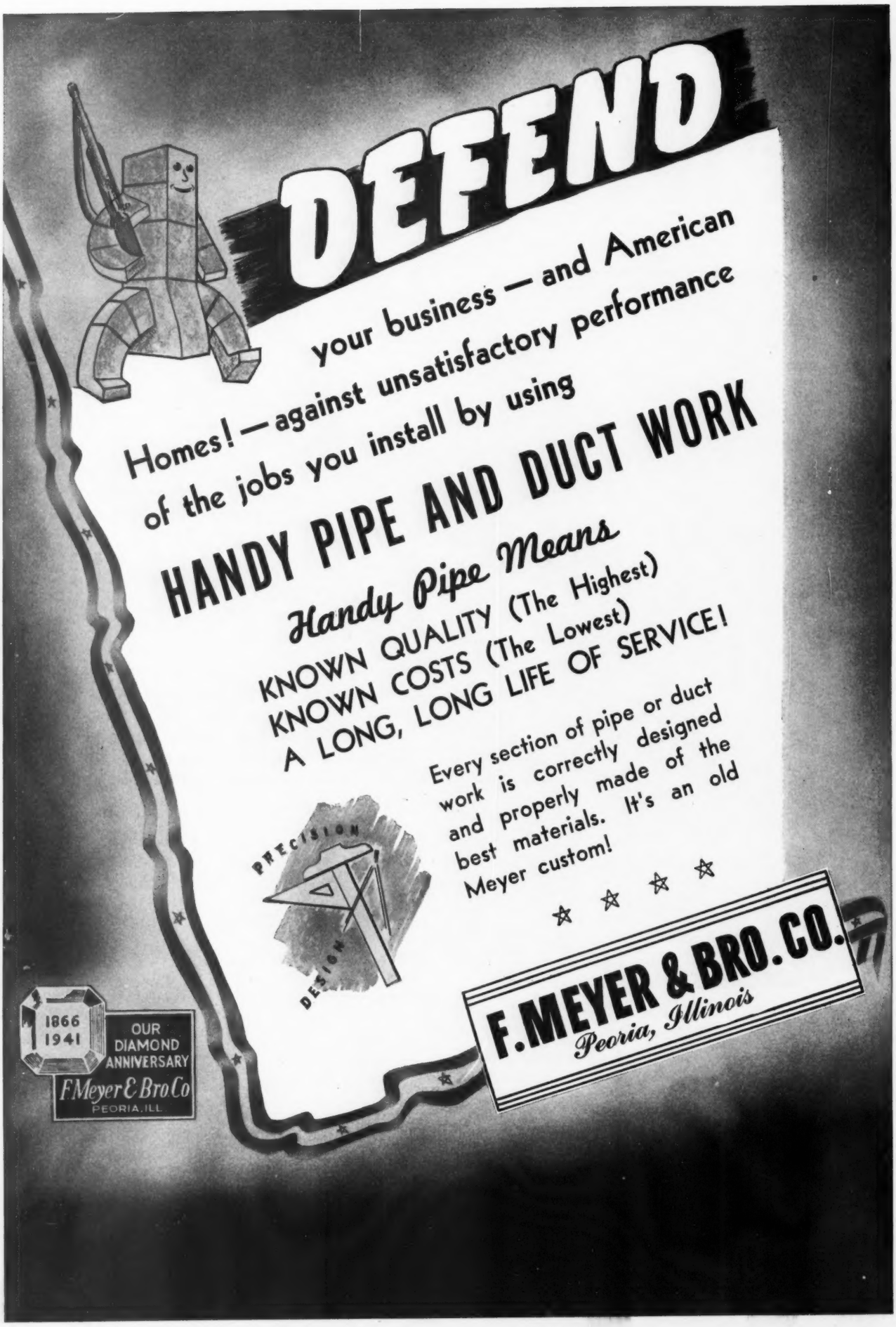
SERIES A
Gas Fired Air Conditioning Unit. Quality—Comfort—Economy.

SERIES H
Gas Fired Utility Air Conditioning Unit — where space is important.

SERIES G
Gas Fired Gravity Unit—Economy for the small home.

SERIES 8000
Oil Burning Air Conditioning Unit. Compact, efficient.

THE C. A. OLSEN MANUFACTURING COMPANY, ELYRIA, O.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your business — and American Homes! — against unsatisfactory performance of the jobs you install by using
HANDY PIPE AND DUCT WORK
Handy Pipe Means
KNOWN QUALITY (The Highest)
KNOWN COSTS (The Lowest)
A LONG, LONG LIFE OF SERVICE!
Every section of pipe or duct work is correctly designed and properly made of the best materials. It's an old Meyer custom!
PRECISION
DESIGN
1866
1941
OUR DIAMOND ANNIVERSARY
F. Meyer & Bro Co
PEORIA, ILL.
F. MEYER & BRO. CO.
Peoria, Illinois

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FITZGIBBONS DIRECTAIRE CONDITIONER

NO CHANCE FOR LEAKS in this one-piece conditioner! The gases or dust of combustion cannot possibly contaminate the clean air stream. All joints are made positively **gas-tight, dust-tight, air-tight** by Fitzgibbons Weldseal construction—an approved method of electric welding that makes the basic unit practically jointless! This welding process is possible, because the stock to be joined is 7-gauge steel plate — much stronger and heavier than is usually used in building conditioners. This steel, incidentally, has an admixture of copper, to neutralize possible corrosion.

SELL LIFETIME AIR CONDITIONING in the solidly-built, eminently substantial Fitzgibbons Directaire. Sell ECONOMY, too—for this unit has every Fitzgibbons fuel-saving feature. Sell ADAPTABILITY, in the six Directaire sizes, suitable for any home from the small basementless cottage to the largest residence.

Exclusive Sales Franchises Open — Mail this coupon Today!

AA-7

Fitzgibbons Boiler Company, Inc.
101 Park Avenue, New York, N. Y.

Send me details of Franchise and Catalog Data of the DIRECTAIRE.

NAME..... COMPANY.....

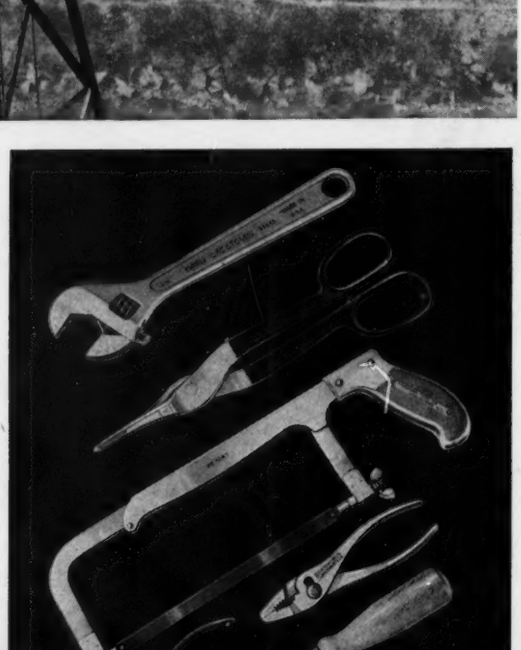
STREET..... CITY..... STATE.....

Where trustworthy tools are vital

Few jobs provide more in the way of spectacular hazards than those that face the lineman. About him and below him lurk potential destruction, yet his safety record is surprisingly good. The reason is that linemen are taught to be forever careful — careful of their personal equipment, careful of every movement . . . careful and super-critical of the tools they use. And it's hard to find a lineman who doesn't have some Crescent Tools!

Crescent Tools include adjustable wrenches, pliers of all types, hacksaws, snips, screwdrivers, etc., etc. They are sold under the "Crescent" and "Crestoloy" trade names by hardware dealers and industrial distributors everywhere.

CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.



YOU CAN ALWAYS DEPEND ON

CRESCENT TOOLS

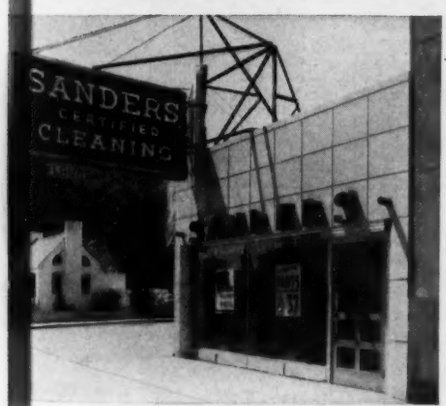
Mr. A. V. Cauhorn, Detroit Janitrol Dealer, and his showroom.

"I DON'T CARE WHETHER THE JOB IS HOME, OFFICE OR FACTORY AS LONG AS IT'S GAS HEAT WITH JANITROL ...THAT'S WHAT BUILT MY BUSINESS"

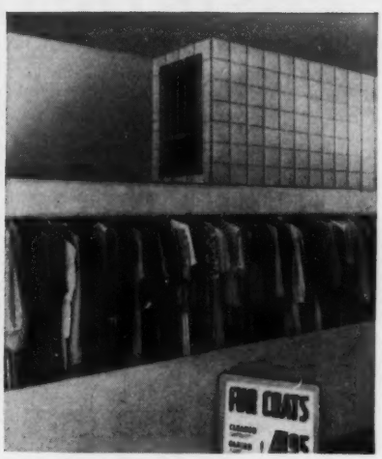
A. V. Cauhorn

SINGLE UNITS IN 1937...6 CARLOADS AT A TIME IN 1941!

Note this typical Janitrol home installation of Mr. Cauhorn's. It is representative of the neat appearance possible with Janitrol.



Illustrated here is one of the many Cauhorn commercial installations.



"JANITROL Gas Fired Air Conditioning and Heating Systems have enabled me to build a business far bigger than I had hoped," says A. V. Cauhorn, of Detroit.

"In 1937, after years of experience installing all kinds of heating equipment," says Mr. Cauhorn, "I then decided that Janitrol Automatic Gas Heating gave the home owner more freedom, cleanliness and satisfaction than any other form of home heating. I found, too, that it was more satisfactory for stores and factories.

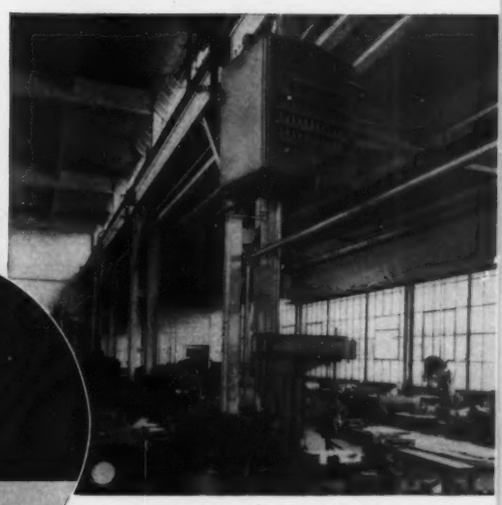
"Now, after only four years, I find my business has grown by leaps and bounds. Profits have grown with it. Janitrol has given me a line of Gas Fired Heating Systems, Unit Heaters, Forced Air and Gravity Air Conditioning Systems that enable me to make proper heating installations in buildings of all sizes in small, no-basement homes, larger homes, offices and great factories.

"Janitrol has been the foundation on which my business was built. Designed specifically to burn gas, Janitrol Units are built to provide lifetime service without costly repairs. I can sell Janitrol to anyone who will investigate and actually compare quality and performance. I firmly believe that any contractor or heating service dealer should investigate the Janitrol line if gas for heating is available in his territory."

We believe that the opinions of Mr. Cauhorn, as expressed above, represent a true portrayal of Janitrol's value to the heating contractor. May we give you full information about the Janitrol dealer franchise?

SURFACE COMBUSTION CORPORATION, TOLEDO, OHIO

Offices and Engineering Service in Principal Cities



Mr. Cauhorn has capitalized on industrial heating with Janitrol, too. Above installation is in tool plant, pictured at left.

JANITROL

SC

WINTER AIR CONDITIONERS • CONVERSION BURNERS • UNIT HEATERS • GRAVITY FURNACES

Let it lead more sales and profits to you this year!

DEALERS have discovered that it is far easier to start sales and to *close them* when they sell the line of **SUNBEAM** Warm-Air Furnaces and Winter Air Conditioners.

And no wonder—for **SUNBEAM** products are noted for quality, dependability and satisfaction—accepted and approved by homeowners, architects and builders alike.

The complete line includes scientifically engineered Units in all sizes, all price ranges—for Coal—stoker or hand-fired —Oil or Gas. It enables you to meet any product or price requirement in *any home*.

In addition, you enjoy the benefits of **SUNBEAM**'s national advertising—striking, colorful new literature, many types of dealer helps and an Easy Payment Plan for modernization that gives your customers as long as 3 years to pay—*gives you cash on installation!*

Today write for full information and the name of the **SUNBEAM** Jobber nearest you.

AMERICAN RADIATOR & Standard Sanitary

New York **CORPORATION** *Pittsburgh*

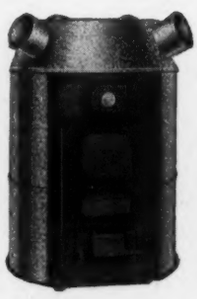
Copyright 1941, American Radiator & Standard Sanitary Corporation

AMERICAN HEATING EQUIPMENT COSTS NO MORE THAN OTHERS

THE NEW MOHAWK—A beautiful, new, high-quality, moderately priced GAS-FIRED Winter Air Conditioner. Made in 9 sizes from 60,000 to 300,000 B t u input per hour. Heating Element is made in 2 sections of rugged cast iron. Jacket is finished in smart Placid Two-Tone Blue.

(*left*) **THE CLIFTON**—The Ace of Steel Furnaces—for Oil or Coal—stoker or hand-fired. The Clifton is a virtually seamless one-piece unit constructed of rugged boiler plate. Many excellent, perfectly coordinated features assure efficient, economical operation.

(*right*) **THE KENWOOD** — Although low in cost, the Kenwood is a rugged, skillfully made cast iron Furnace for economical operation with Coal. Has heavy one-piece radiator, duplex grates and many other features.



Stainless

BRINGS IN THE DOLLARS for Contractor and Owner

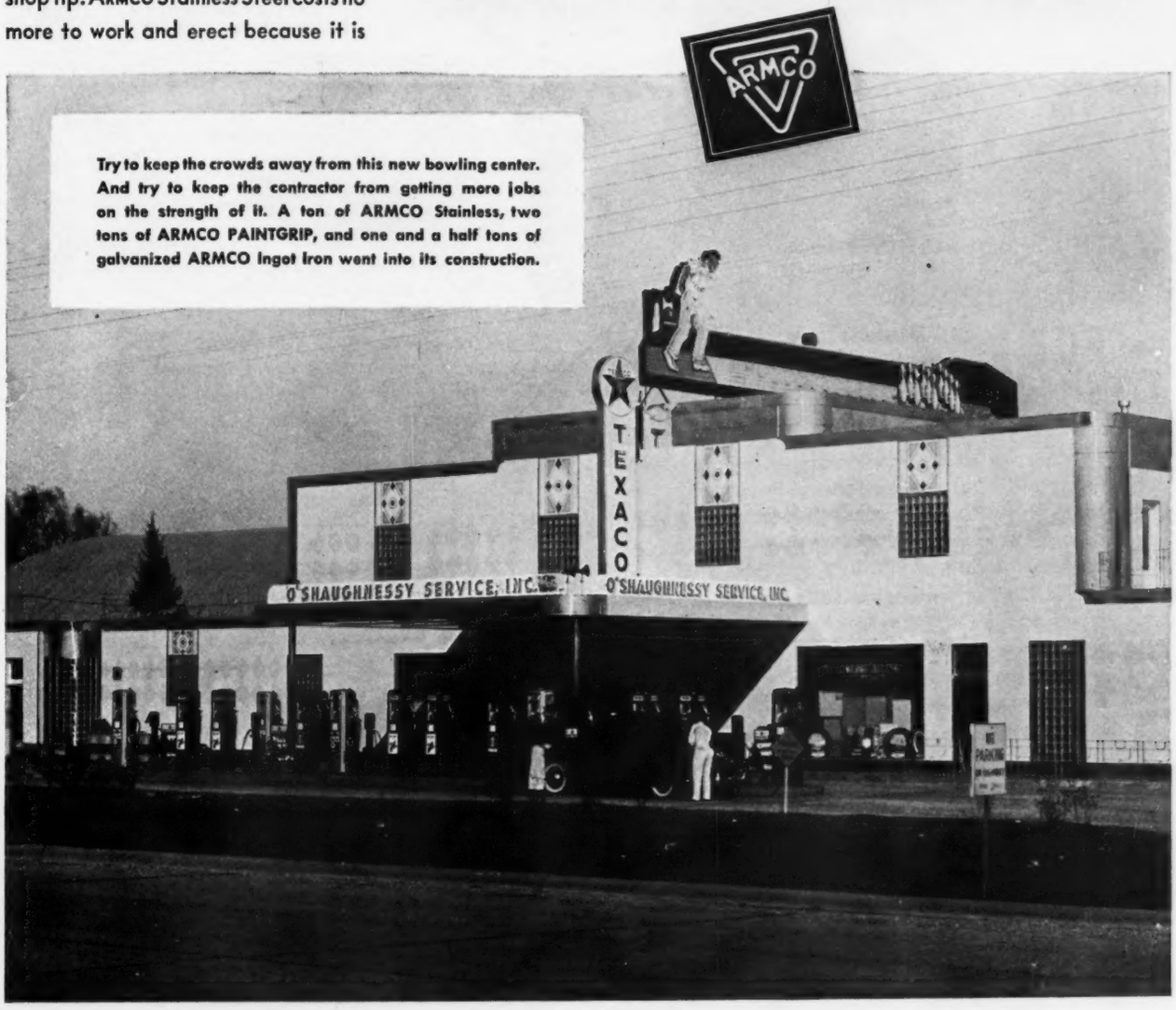
• When you do a job that makes money for the customer, you're sure to profit from it. This was the experience of the contractor who installed more than a ton of ARMCO Stainless Steel on this New Orleans bowling center.

You can see from the picture why it is attracting plenty of business. The stainless sign, canopy, trim and corners all combine into an effective eye-stopper by day or night. And here's a shop tip: ARMCO Stainless Steel costs no more to work and erect because it is ductile and can be soldered much like other metals. And because it is a premium-quality metal, you are justified in asking a good price for your work.

Consider this too: The high attention-value of stainless steel will induce prospects to ask, "Who did that job?" Once you have a reputation for doing first-class work with this fine-looking, rustless metal, more and more stainless jobs will come your way.

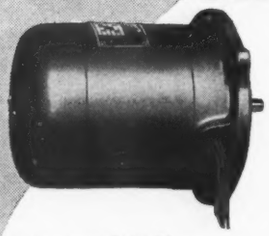
We'll be glad to help by supplying you with some useful fabricating and selling information. And when you write, be sure to ask also about galvanized ARMCO PAINTGRIP sheets. The American Rolling Mill Company, 1211 Curtis Street, Middletown, Ohio.

ARMCO STAINLESS STEEL


ARMCO
Try to keep the crowds away from this new bowling center. And try to keep the contractor from getting more jobs on the strength of it. A ton of ARMCO Stainless, two tons of ARMCO PAINTGRIP, and one and a half tons of galvanized ARMCO Ingot Iron went into its construction.
TEXACO
O'SHAUGHNESSY SERVICE, INC.
O'SHAUGHNESSY SERVICE, INC.

Meet Every Cooling, Heating and Ventilating Requirement of the Defense Program with

CENTURY *Job Selected* MOTORS

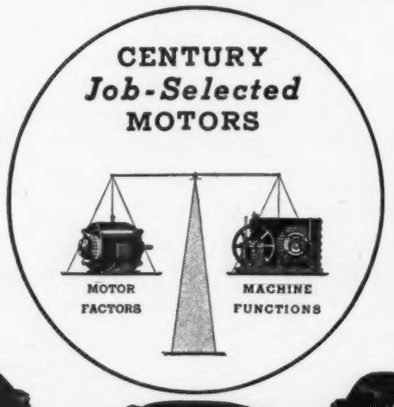


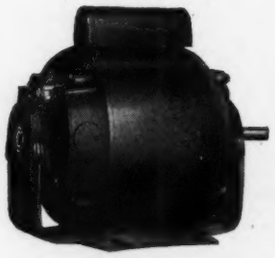
Century Split Phase
Oil Burner Motor

Century fractional horsepower Squirrel Cage Motor

Century Capacitor Motor
with rigid base

Century Direct Current Motor
for all DC applications





Century Capacitor
Motor with cushion base

Century Split Phase
cushion base motor

Century Vertical
drip proof motor

Century Repulsion Start
with rigid base

FOR Fans, Blowers, Unit Heaters, Unit Coolers, Refrigeration Compressors, Pumps, Oil Burners, Stokers

The user of electric motor drives for air conditioning throughout the defense program is presented with the problem of selecting the *right motor* for four widely diversified uses — air cooling, heating, circulating and fluid pumping.

Because of Century's wide range of motor types and sizes, from fractional to 600 horsepower, Century provides the proper Job Selected motor to correctly balance the demands of practically any application.

In addition to the demands of the load itself, the location of the installation influences motor selection, while different atmospheres may require such Century motor types as Splashproof, Stormproof, Totally Enclosed Fan Cooled, Explosion Proof (Underwriters' Label), or special types of insulations on Open Motors.

Whatever your problem, you'll find Century Job Selected Motors assure you and your customers peak performance, maximum economy and economical operation. For Century Motors are designed and engineered to meet the specific demands of each particular job.

Call in your Century Motor Specialist today —find out how Century Job Selected Motors may improve performance of your product or your installations.

CENTURY ELECTRIC COMPANY
1806 Pine Street St. Louis, Missouri
Offices and Stock Points in Principal Cities

Century MOTORS

One of the Largest Exclusive Motor and Generator Manufacturers in the World

CHRYSLER AIRTEMP DEALERS MAKE MONEY

LOOK WHAT CURRIER LUMBER COMPANY DID! SOLD 1600 AIRTEMP FURNACES FIRST YEAR

In its first full year as an Airtemp Dealer, Currier Lumber Company, Detroit, sold 1,600 Airtemp units—approximately $564,000 worth of business! And Currier figures that this 1,000 air-conditioning furnaces and 600 gravity furnaces in a year is just a start. The 1941 sales goal is 2,500 units!

Currier attributes his success in selling Airtemp products to the same policy which made his business succeed from the start—putting his company in a position to sell the builder everything he needs, and handling only the most modern line of equipment. Currier's heating service does not end with the sale. He follows through on every installation with two inspections and then supplies 24-hour-a-day, 7-day-a-week service. This combination of the right products and real service builds profitable heating volume!

READ WHAT CURRIER SAYS—

Patrick J. Currier, President, Currier Lumber Company (left), gives three reasons for handling Chrysler Airtemp heating and air-conditioning equipment exclusively. These same reasons will spell profits to you as a heating dealer—

THREE REASONS FOR AIRTEMP

Currier says: "Three reasons have been responsible for our success with the Airtemp line. First, we know that Airtemp equipment is well engineered and well built and will give our customers satisfaction with a minimum of service attention. Second, a nationally-known line like Airtemp is easier to sell; it's easier to buy, too—we do business with just one responsible manufacturer. Third, we believe the Chrysler Airtemp line is the best-looking line on the market—it has the eye appeal that helps sell home equipment."

Currier Lumber Company's main office and mill buildings, Detroit, Michigan, cover twelve acres. Currier has twenty heating subdealers specializing on the replacement market.

CHRYSLER AIRTEMP

AIRTEMP DIVISION OF CHRYSLER CORPORATION, DAYTON, OHIO

MAIL THIS CARD FOR THE AIRTEMP PROPOSITION!

Airtemp Division,
Chrysler Corporation, Dayton, Ohio

Gentlemen:

Send me complete information on the Chrysler Airtemp money-making Proposition for dealers.

*Name*_____

*Address*_____

*City*_____ *State*_____

AIRTEMP OFFERS EVERY TYPE OF HEATING DEALER A MONEY-MAKING PROPOSITION

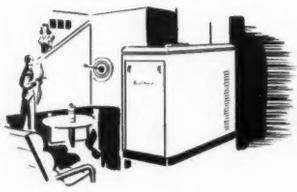
The success of Currier Lumber Company, Airtemp dealers in Detroit, is just an example of what any aggressive merchandiser can accomplish with the Airtemp line. Chrysler Airtemp has carefully built a "Proposition" for dealers which includes everything they need for success —a Complete Line, engineered, built and warranted by Chrysler, backed by Chrysler's world-wide reputation for pioneering research and engineering leadership; full Merchandising, Sales Training and Advertising Aid from an experienced, understanding factory personnel; a money-making Sales Contract, and a liberal Service Policy including field service aid.

1 LINE IS COMPLETE—Chrysler Airtemp makes a complete line of heating and air-conditioning equipment—everything in gas and oil-fired boilers as well as everything in warm air furnaces: oil, gas and coal furnaces; hot-air, hot-water and steam systems; oil burners; water heaters and "packaged" cooling units for home and business.

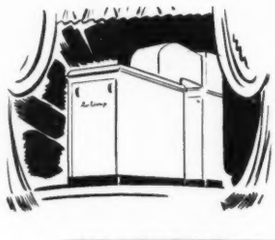
2 CHRYSLER ENGINEERED—The entire Airtemp line is engineered by Chrysler—famous for its contributions in the automotive and air-conditioning fields. The Chrysler Corporation in Detroit and the Airtemp Division in Dayton, have the finest laboratory equipment in the world for the study and testing of air-conditioning apparatus, furnaces and boilers.

3 EASIER TO SELL—When you tell prospects that Airtemp equipment is built and warranted by Chrysler Corporation, they accept its excellence without question. Every fourth family in the U. S. already owns and operates some Chrysler product!

4 EYE APPEAL—As in Chrysler cars, eye appeal—beauty of design and finish—is an important factor in the sale of Airtemp units. All appeal to home owners—men and women!



5 MINIMUM SERVICE—Airtemp dealers find that Airtemp engineering and manufacturing precision, plus Chrysler methods of inspection, mean an absolute minimum of service attention to all Airtemp equipment. Technical assistance from field service men available to dealers.



6 A SALES LEADER—Airtemp makes available to its dealers the only practical, low-cost, combination heating and cooling unit on the market—*year-'round* air conditioning for homes of even modest cost! Airtemp complete merchandising aids help you sell.

Postage Will Be Paid by Addressee

BUSINESS REPLY CARD
First Class Permit No. 885, Sec. 510, P. L. & R., Dayton, Ohio

No Postage Stamp Necessary If Mailed in the United States

Mail This Card Today for Details

AIRTEMP DIVISION, Dept. A. A.—7

Chrysler Corporation,

DAYTON, OHIO

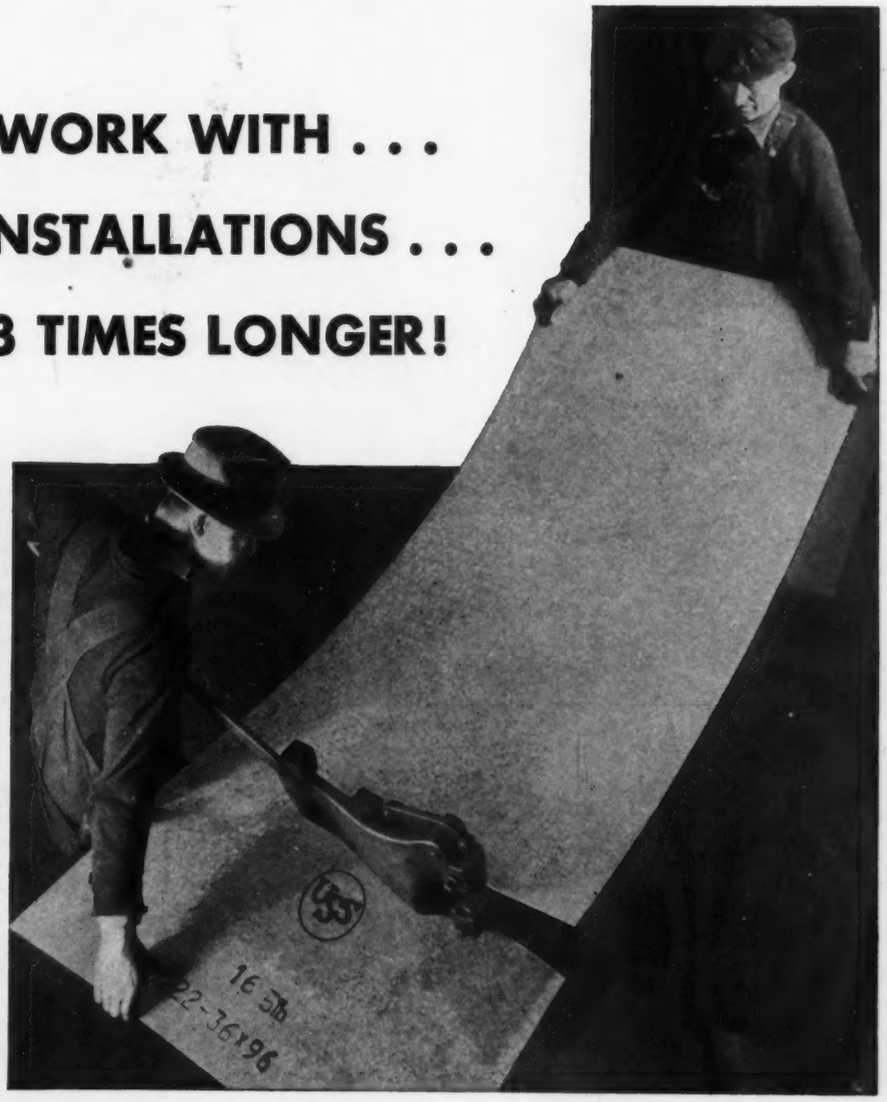
CHRYSLER AIRTEMP

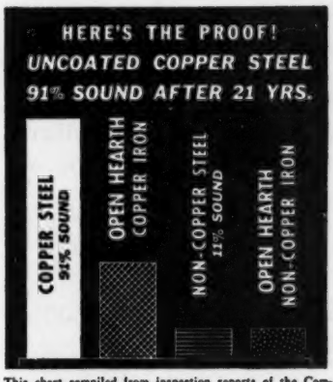
AIRTEMP DIVISION OF CHRYSLER CORPORATION, DAYTON, OHIO

★ EASIER TO WORK WITH . . .

★ SPEED UP INSTALLATIONS . . .

★ LAST 2 TO 3 TIMES LONGER!





This chart compiled from inspection reports of the Committee on Corrosion of Iron and Steel, A.S.T.M. Proceedings 1937, shows results of tests carried on at Annapolis, Md. from 1916 to 1936. After 21 years' exposure, 91% of COPPER STEEL sheets remained "sound" (unperforated). Other materials were decidedly inferior.

U·S·S Copper Steel Sheets have three outstanding qualities that make them the first choice of leading metal workers—and the ultimate users.

FIRST, sheets of U·S·S Copper Steel are easy to fabricate. They make possible true bends, tight seams and neat joints. Second, the ease with which they can be fabricated cuts down installation time and results in substantial savings on the job. Third, they have 2 to 3 times the resistance of plain steel to atmospheric corrosion. The added copper makes this possible, but the added cost is so low that it makes little difference in the completed product or installation.

U·S·S Copper Steel Sheets, both galvanized and black, are available in all important cities. For complete information write to one of the companies below.

U·S·S COPPER STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
Scully Steel Products Company, Chicago, *Warehouse Distributors* · United States Steel Export Company, New York

UNITED STATES STEEL

AIR CONTROL ADDS THE *"Finishing Touch"*

TO THEIR HIGH QUALITY LINE OF REGISTERS AND GRILLES—

INFRA-RED BAKING—YOUR ASSURANCE OF A BETTER AND MORE DURABLE FINISH

In keeping with AIR CONTROL'S policy of high quality and the most modern production methods, we have installed this new and revolutionary infra-red baking system, which has attracted wide attention in the automobile industry. AIR CONTROL leads again in the use of this process for Registers and Grilles.

All AIR CONTROL products are sprayed with an especially adapted paint, and are conveyed through a tunnel of infra-red lamps, where the infra-red rays strike every external surface. Penetrating the finish, these rays heat the metal and cause the paint to bake from the INSIDE OUT. This unusual treatment causes the paint to adhere firmly to the metal and gives an unsurpassed finish. This means that AIR CONTROL products have a more durable and lustrous finish.

Another example of the "Extra Quality" you receive when you specify "Air Control."

AIR CONTROL Distributors in Principal Cities—Write Now for the Name of Your Nearest Air Control Jobber!

AIR CONTROL PRODUCTS, INC.
MUSKEGON MICHIGAN

Model GS90
Square casing with Mueller's standard green crinkle finish. Pitched hood. Floor space 28 x 28 in.

Announcing the

Model GR-90
Round galvanized casing with pitched hood. Floor space 32-inch diameter.

MUELLER G90

Gas-fired Gravity Furnace

to help you sell *satisfactory* gas heating for lower- and moderate-priced homes

This new Gas-fired Gravity Furnace gives you the sound engineering design and quality construction you expect in a furnace bearing the Mueller name—plus an economical first cost.

Unlike many furnaces of the drum-and-radiator type, this is strictly an *up-draft* unit—eliminating trapping of condensate and possibility of corrosion which may occur with down-draft radiators.

The radiator of this furnace is constructed with internal baffles so that the products of combustion separate into four individual streams as they pass back and forth and upward through the radiator—this gives you a highly efficient furnace incorporating up-draft design.

AGA-approved. Input 90,000 B.t.u. per hour, bonnet output 67,500 B.t.u. Humidifier optional equipment.

With this addition to the famous Mueller line, you now have still another product to help you fulfill more adequately the market requirements of warm air heating.

Tie up with Mueller, for a successful all-around furnace business and a reputation that insures your future. Call in your Mueller distributor. If you do not know him, write for his name and Mueller's illustrated literature. *L. J. Mueller Furnace Company 2010 W. Oklahoma Ave., Milwaukee, Wisconsin.* D-17

Gas

Oil

Series OVP — Oil-fired Winter Air Conditioner equipped with Mueller Vaporizing Oil Burner.

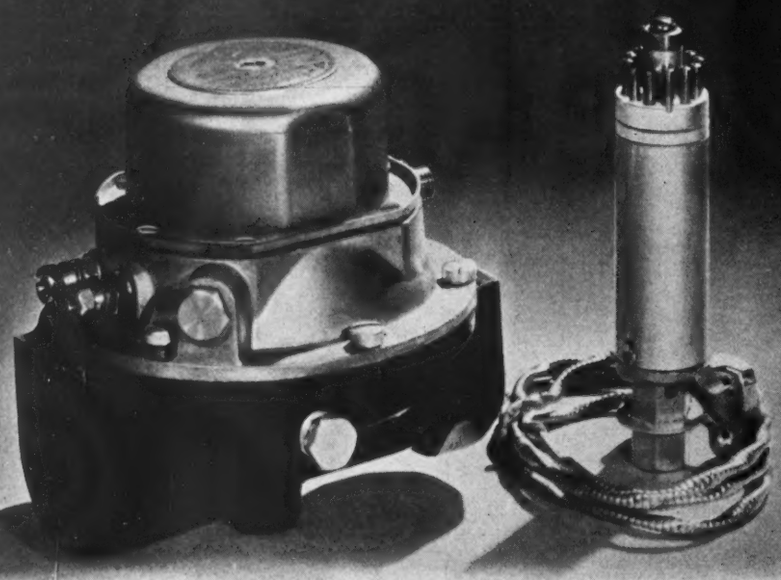
Coal

Series FB — Coal-fired Winter Air Conditioner. Handsome, compact, economical.

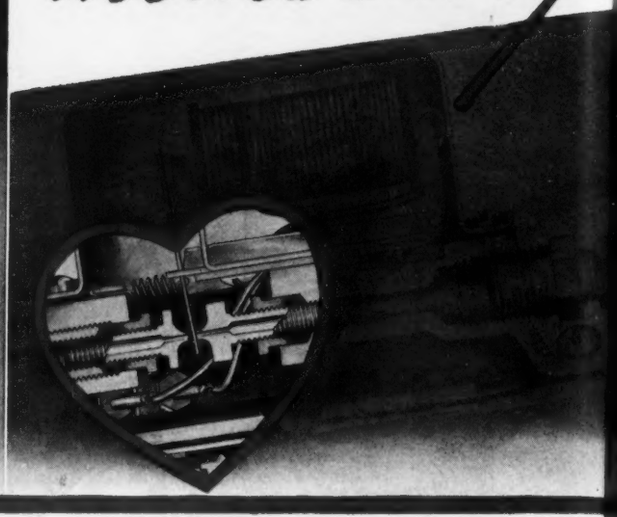
MUELLER *Milwaukee*

HEATING AND AIR CONDITIONING

THE IMPROVED B-60 GAS VALVE



Here's the inside story



RADIATION RESPONSIVENESS

ONLY THE NEW GENERAL CONTROLS TRIMTHERM LIVES IN EVERY ROOM

FOR ITS THERMALLY RESPONSIVE MEMBER IS ITS UNLACQUERED, UNHOUSED COVER, SUBJECT TO IMMEDIATE RADIANT HEAT AND AIR TEMPERATURE CHANGE . . .

Unlike conventional thermostats, whose thermally responsive mechanism is housed in an obtrusive protective cover, the thermally responsive mechanism of the General Controls Trimtherm is the large thermostat cover itself, unhoused, subject to immediate radiant heat and air temperature change. This unlacquered, unpainted cover plate readily follows room temperature, and its bi-metal action is as fast as any standard mercury thermometer.

This scientifically correct design not only lets the Trimtherm actually *live* in the room, but also gives it its correct parallel and modern lines. Room walls are vertical; so is Trimtherm's design; remember, a Trimtherm extends but 13/16″ off the wall. Its blending, unobtrusive, easily cleaned, dull chrome cover reflects surrounding room colors.

For accessibility, the detachable cover simply snaps on to an unbreakable plastic base plate which acts as blanket to thermally isolate the thermostat from wall drafts and wall radiation. For versatility, the temperature range is from 50° F. to 90° F., with but ½° F. differential, without false heat input.

The new, modern-as-tomorrow Trimtherm is included in all General Controls *ALL-GAS* gas heating package sets in the model desired. Ask for descriptive 12-page Bulletin for full Trimtherm details and specifications.

WRITE FOR OUR NEW 12-PAGE GAS HEATING CONTROL BULLETIN TODAY

GENERAL

267 Fifth Avenue, New York City • 687 Boylston Street, Boston, Mass. • 4513 North Broad Street, Philadelphia, Pa. • 421 Southwest Boulevard, Kansas City, Missouri 598 Peachtree Northeast, Atlanta, Georgia • 1100 Cadiz Street, Dallas, Texas

HERE'S WHERE GENERAL CONTROLS B-60 GAS VALVE GETS ITS *AMPLE POWER AND LONG LIFE:* IT HAS ONE OF THE INDUSTRY'S MOST POWERFUL VALVE OPERATORS,— YET IT OPERATES ON A SELF-GENERATED CURRENT OF 250 MILLIVOLTS (¼ VOLT)

PLENTY OF POWER

There, in the heart of the cutaway view, you see B-60's pilot valve operating mechanism,—the two jet-like ports, the frontal area of which is only 12/10,000 of an inch. But, this is the important point: the valve power at the port is in excess of eight grams,—or, translated into force per square inch of area, the valve force is 14.5 lbs. per square inch, which compares most favorably with any other type of electro-motor operated valve. You'll agree that this kind of operator can be considered as being more reliable than even the typical line current operated device. Furthermore, dust, gum or oil cannot impair its future operation.

TROUBLE FREE LIFE

Because B-60's small valve diaphragm only displaces ½ to ¾ of a cubic inch of gas per valve operation, average computation reveals that the valve would open and close some 2750 times before one cubic foot of gas would flow through the control chamber and pilot valve jets. So, it is easy to see why a B-60 has a long life of trouble-free operation. For in 20 to 40 years of operation on an average installation, the largest B-60, 1½" I.P.S., would handle but a total gas flow of 1160 cubic feet, and the smallest B-60 but 183 cubic feet. Comparing B-60's jet valve operations for 30 years against a typical pilot burner, the same amount of gas is used by such a pilot burner in from 8 to 48 days.

HERE ARE A FEW OF ITS 24 ENGINEERED FEATURES

Visible, easy-to-read calibrations; setting knob on cover obviates wall smear; only two mounting screw holes and ¼" cable opening necessary in wall; all terminals easily accessible for wiring; surface mounted with flush appearance; dirt and dust eliminated by gasketed cover and felt washers; genuine platinum iridium contacts; standard wall switchbox size; no tools needed for repairs.

TRIMTHERM

ACTUAL SIZE

THERMOMETER-THERMOSTAT

with visible indicating thermometer

Other models: Regular thermostat and Timer-thermostat with compact 13-hour clock. Night cut-off available in all models.

4 BIG IMPROVEMENTS NOW MAKE IT *Better Than Ever*

While the new B-60 Gas Valve is basically the same today as it was at the time of its introduction, three years ago, 4 big changes are now announced that improve its proved performance.

1. Its compact, tamper-proof cover is securely held. There are no external gas ways.
2. Its integral pilot valve assembly is fully accessible, easily tightened, and has a rigid vent connection.
3. New stronger valve bodies of Hi-tensile iron. Increased seating pressures. Maximum capacities.
4. Main line strainer eliminates possibility of excess pipe dope or foreign matter from lodging under valve.

Yes, General Controls has improved the proved,—the valve that has made heating history for three solid seasons is now better than ever. Remember, no outside electric current is required,—the ingenious pilot generator supplies all the necessary operating current. Furthermore, the B-60 is noiseless and trouble-free and safe. All parts are sealed; no dust or foreign matter can enter its pilot mechanism. The new B-60 Gas Valve is available in sizes from ⅜" to 1½" I.P.S. for use with manufactured, natural and liquefied petroleum gases. It is included along with the new General Controls Trimtherm, 30 feet of wire and a pilot generator in complete automatic gas heating package sets. These sets provide for safe, automatic installations in gas furnaces, floor furnaces, boilers and industrial applications, etc. Request complete specifications today.

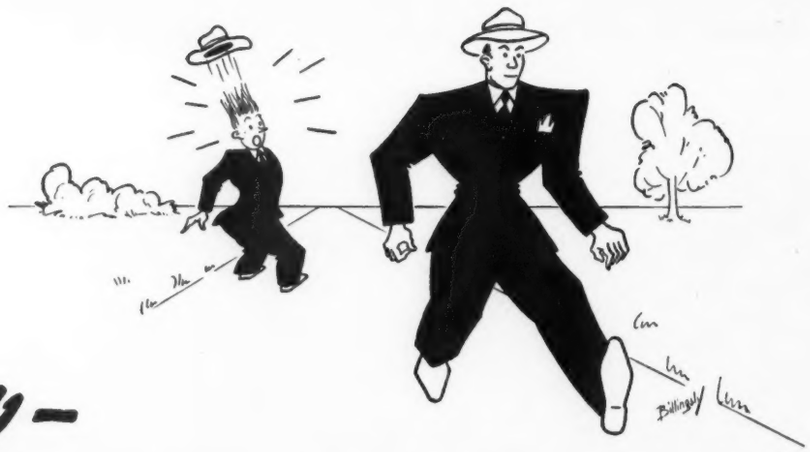
SIMPLIFIED TWO-WIRE CONTROLS ARE BETTER

CONTROLS

25 North Live Oak Street, Houston, Texas • 915 Bryant Street, San Francisco, California • 801 Allen Avenue, Glendale, California • 1505 Broadway, Cleveland, Ohio • 6432 Cass Avenue, Detroit, Michigan • 450 East Ohio Street, Chicago, Illinois

STOCKS IN ALL PRINCIPAL CITIES

GC



Wow— WHAT A BUILD!

● **YES, four years ago,** Winkler was a small sapling in the forest of stoker manufacturers, but, today, Winkler is a *mighty oak* whose towering height is a landmark for stoker merchants. With roots imbedded deeply in public acceptance and distributor's profits, Winkler grows stronger every year. And the Winkler franchise becomes the guide for more alert stoker merchants on the hunt for stoker profits.

There are a number of reasons for Winkler's growth—the *Winkler Stoker*, the *Winkler Sales Plan*, the *Winkler Direct From Factory Franchise* with its tremendous advantages—a host of other reasons. But above all, Winkler has grown strong because **Winkler Distributors like to sell Winkler Stokers and they make money doing it.**

Winkler Distributors like to sell Winkler Stokers because they have confidence in Winkler and can go out and "tell the world" the Winkler story, earnestly, forcefully—without boasting, and without any apology.

Back of their statements stands the Winkler Stoker with its *powerful* Fully Automatic Transmission, ready to demonstrate its strength, *long life* and *efficiency* by crushing rock, steel pipe, or oak flooring. There is no "faith selling" with Winkler—just "fact selling," by actual demonstrable performance.

With Winkler's over-all *rugged* construction, the *Winkler Eez-Air Control*, and the Winkler *Pneumatic Smoke-Back Eliminator*, Winkler Distributor's assertions of greater cleanliness, greater economy, greater comfort, and greater savings are voiced with full confidence that these benefits *will be delivered.* It is a pleasure for Winkler Distributors to sell what they know they *can* deliver.

Winkler Distributors make money because they buy *quality at the right price.* They can meet price competition with a quality stoker. Their service costs on Winkler are practically nothing. Many Winkler Distributors, who sold other stokers for years, say their service costs on Winkler are *less than one-tenth* their costs with previous stoker equipment.

Stoker Merchants! Do you want to be the giant oak in the stoker business in your town? Do you want to make more sales and make them easier? Do you want to enjoy selling stokers? Do you really want to make money? **Investigate the Winkler Direct From Factory Franchise today!**

U. S. MACHINE CORPORATION

600 WEST MAIN STREET • LEBANON, INDIANA

Jim and Mary

BELIEVE IN AMERICA AND EVERYTHING THAT'S GOOD

Jim and Mary might be the folks next door or the Jones family who live on the next street. Neither rich nor poor, they're just average American home owners who want their share of the good things of life, but know full well that it is up to them to earn them.

This country is full of "Jims and Marys". Some of them are your customers. And, like you or I, they are only too glad to show their appreciation when they get full money's worth in anything they buy. Earn their confidence with honest materials and workmanship and you have the basis of a prosperous business.

For more than 82 years, OSBORN has been helping the sheet metal trade meet the "Jims and Marys" demands by stocking the almost countless number of quality-proved products you use in your work. And it's significant that in the territories we serve, thousands of successful sheet metal shops rely on OSBORN for their materials, tools and machinery.

PRIME METAL SHEETS
EAVES TROUGH, CONDUCTOR PIPE, ETC.
ROOFINGS, NAILS AND PAINTS
FURNACES AND ACCESSORIES
SHEET METAL TOOLS
AND MACHINERY

A DEPENDABLE SOURCE
OF SUPPLY FOR 82 YEARS

THE J. M. & L. A.
OSBORN Co
CLEVELAND, OHIO
BUFFALO • CINCINNATI • DETROIT
Manufacturers—Distributors of Metals and Metal Products

You can cash in..

on projects like these

With industrial expansion swinging to new highs, opportunities are greater than ever for profitable sheet-metal work. Roofing, siding, vents and ductwork—expanding plants offer many jobs in these and other categories.

When you bid on industrial jobs like these, remember to use Beth-Cu-Loy Copper-Bearing Galvanized Sheets. Fortified against rust by the addition of 0.20 to 0.30 per cent copper, Beth-Cu-Loy Sheets are a must for corrosive factory conditions. At an additional cost of only a few cents per sheet over ordinary galvanized steel, Beth-Cu-Loy will give your customers dollars worth of added protection —and leave you an ample margin of profit.

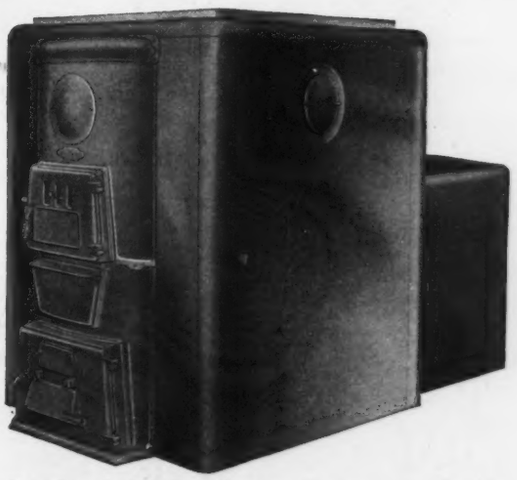
BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

Come and Get 'em!

LARGE INVENTORY BUILT UP IN ANTICIPATION OF DEMAND

Looking forward to a possible shortage of materials and finished heating equipment, we have built up a stock of Warm Air Furnaces which are now available to responsible dealers. If you need furnaces now, or anticipate a need for them later, we suggest that you write us at once.



The Royal Air Conditioning Heater is a modern streamlined unit combining economy, beauty and efficiency in an attractive green enamel steel jacket.

The ROYAL 900 Series is a sturdy, well designed and popular Warm Air Heater. A size for every home. Made for regular pipe and pipeless systems.

ONE OF THE LARGEST AND OLDEST FURNACE PRODUCERS

The Hart & Crouse Corporation is over 100 years old and is one of the largest, as well as one of the oldest, manufacturers of heating equipment. With a normal capacity to produce 25,000 furnaces a year, we are in a position to supply hundreds of dealers with their furnace requirements this Fall. And that's why we say "Come and Get 'em!"

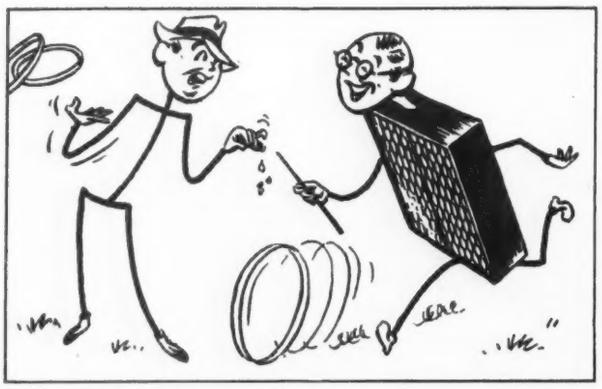
A COMPLETE LINE

The Hart & Crouse Corporation offers a full modern line of Warm Air Furnaces and Air Conditioning Units for residential heating, including the 900 Series which is a truly competitive line. Modern assembly line methods assure expert workmanship at low cost of operation. The name Royal on heating equipment signifies fine quality.

The LIFETIME Warm Air Furnace—fully guaranteed for 20 years—is larger and carries higher ratings, per pot size. It is a deluxe model, cast in "Lifetime" alloy material.

HART & CROUSE
CORPORATION

301 TURNER STREET — UTICA, NEW YORK



Heating Contractor: I don't care two hoops if Fiberglas* Dust-Stop* Air Filters *are* standard equipment on 85% of all forced warm-air heating and air-conditioning equipment!

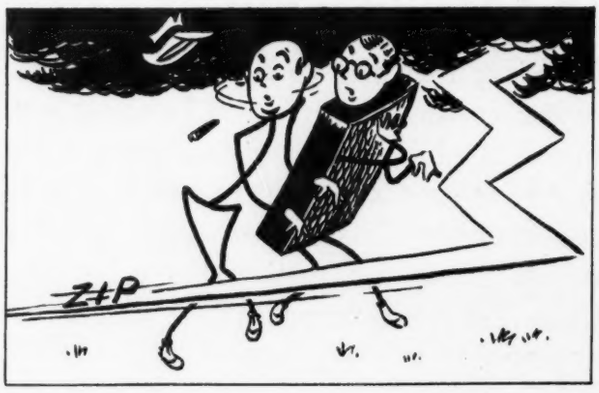
Dust-Stop Man: You're missing a money maker!

H. C.: *What?* Make money on Dust-Stops? G'wan!

D. S.: There's a whale of profit in 'em . . . and they sell *fast!* When replacement time comes around, Dust-Stops have the biggest promotion program you ever saw on filters!

H. C.: The *biggest?*

D. S.: Yes, Sir! And Dust-Stops have the industry's *most complete* set of free dealer helps on filters. You can even get your own listing under the Dust-Stop telephone directory heading!

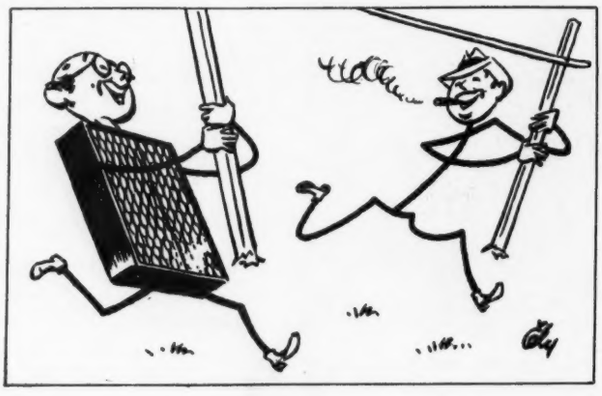


H. C.: Hmm! How much stock must I carry?

D. S.: Practically none! Dust-Stops, guaranteed by the makers of Fiberglas, are delivered to you with lightning-like speed *all the time!*

H. C.: Hey! This sounds like the nuts of an idea!

D. S.: *It is!* And Dust-Stops are one of the most fire-safe of all replacement filters! Their pure glass fibers and adhesive *will not* support combustion!



D. S.: What's more, Dust-Stops have a price and discount policy that's a winner. Everybody profits.

H. C.: Wow! You've knocked me for a row of goal posts. With the Dust-Stop program I can get scores of new filter replacement customers. Thanks for tipping me off!

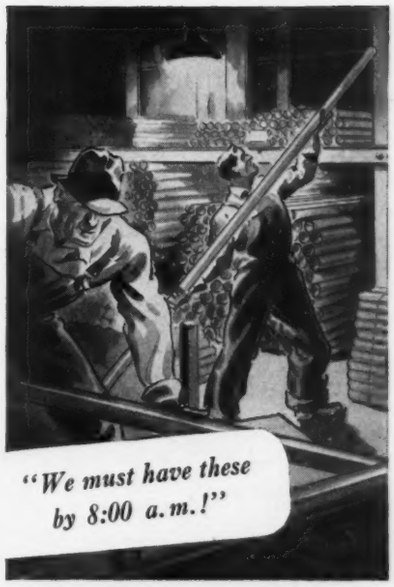
FIBERGLAS* DUSTOP* AIR FILTERS

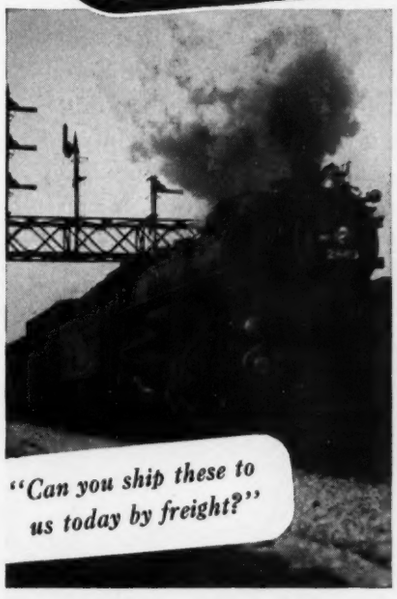
*T.M. Reg. U. S. Pat. Off.

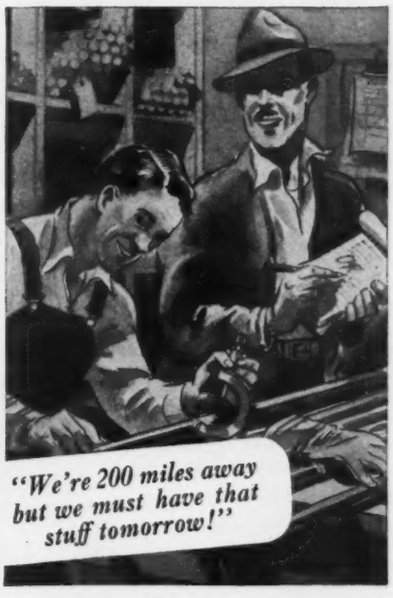
Made by Owens-Corning Fiberglas Corporation, Toledo, Ohio

DIRECT CANADIAN INQUIRIES TO FIBERGLAS CANADA, LIMITED, OSHAWA, ONTARIO

UNUSUAL SERVICE ...even today!







THESE are just a few samples of the calls that are coming in all day long to the eight Scully warehouses. And each warehouse is on the job day and night — making every effort to provide the kind of service that has made the Scully name famous. Phone, write or wire Scully if you need steel, steel products, copper, brass, tools, equipment and machinery. Our warehouse locations—near the great industrial centers—make prompt delivery possible. You'll find Scully a friendly, reliable source of supply. Ask for a copy of our handy Stock List and Reference Book. It's free.

SCULLY STEEL PRODUCTS COMPANY

Distributors of Steel, Steel Products, Copper and Brass

Warehouses at CHICAGO
ST. PAUL - MINNEAPOLIS
NEWARK, N.J.

The Mark of Quality

USS Scully Service

CLEVELAND · PITTSBURGH
BOSTON · BALTIMORE
ST. LOUIS

The Mark of Service

UNITED STATES STEEL

THE THERMOSTAT IS THE

Commander

OF THE HEATING SYSTEM

Like an army in the field, no heating system can be better than its commander, the thermostat. A good system, well commanded, delivers satisfaction. A good system, poorly commanded, can be nothing but a disappointment.

The Detroit 411 Compensated Thermostat for the control of heating systems has proved its superiority in sensitivity and durability. It has eliminated the discomfort of "Cold 70" and the objectionable and unnecessary cost of overheating.

The compensating preheater element of the 411 need not be replaced to meet variations in local heating requirements. A simple screw driver adjustment is all that is needed to take care of any situation.

The 411 is also available in the day and night type, the turn-down being accomplished by the ingenious use of a second preheater which greatly simplifies thermostat construction and holds its cost to a minimum.

A valuable advantage in the use of the 411, sometimes overlooked, is the fact that the same manufacturer also makes a complete line of controls used elsewhere in the heating system. Thus, complete coordination with the thermostat and perfect harmony is secured throughout system operation. When all Detroit controls are used you avoid divided responsibility.

DETROIT LUBRICATOR COMPANY

General Offices: DETROIT, MICHIGAN

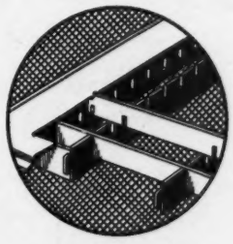
Canadian Representatives: Railway & Engineering Specialties Ltd., Montreal, Toronto, Winnipeg

DURABILT

Floor Registers

and

Cold Air Faces



. . . fine appearance
. . . exceptional strength

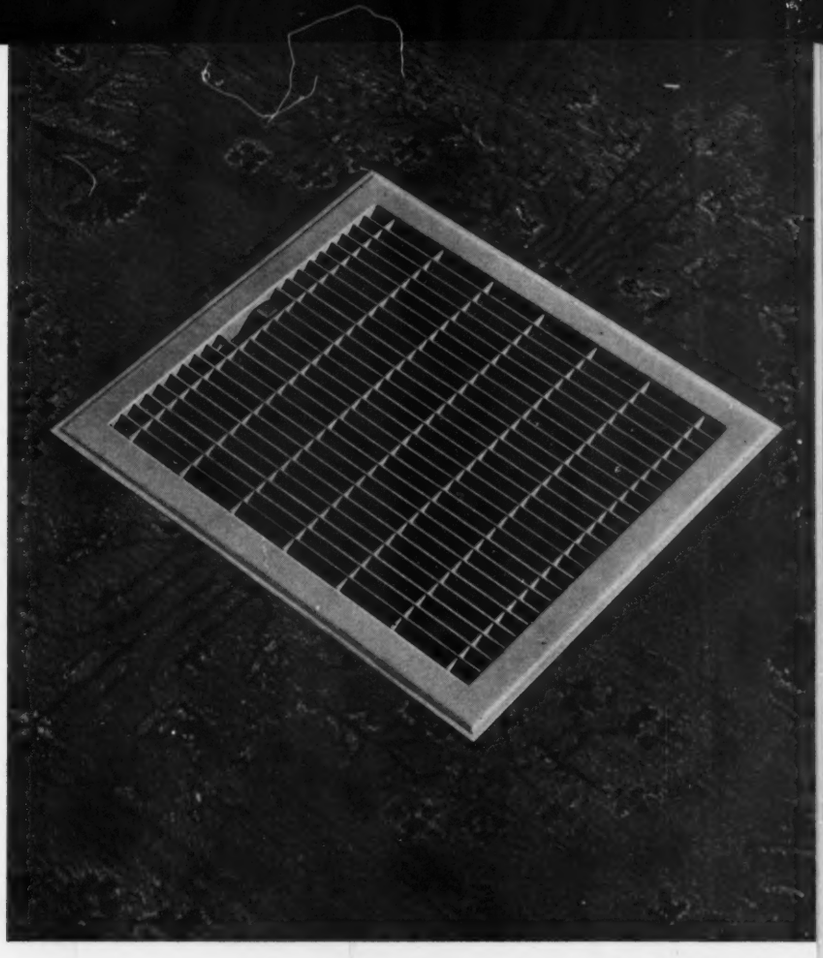


Fig. DR—DuraBilt Register

Now furnished in narrow mesh (½" by 2" on centers) as standard, Auer DuraBilt Floor Registers and Intakes offer you a still finer product, both in appearance and service. The 7/16" by 1-15/16" opening is heel-proof, excludes small objects such as chair legs, and also tends to conceal the register box interior.

These registers and intakes are assembled with flat steel bars, mortised and interlocked at every cross-joint. This assembly is tenoned and locked into welded frame, making a very rigid and durable construction. Open area is 81%. A better register—and, at no advance in price, a better value.

Write for complete Auer Register Book 41, illustrating and listing all types and models for both air conditioning and warm air systems. Special Grille Catalog "G" also sent on request.

A.R

Fig. DSC—DuraBilt Cold Air Face

AUER
Registers
and Grilles

THE AUER REGISTER CO.

3608 Payne Avenue
Cleveland, Ohio

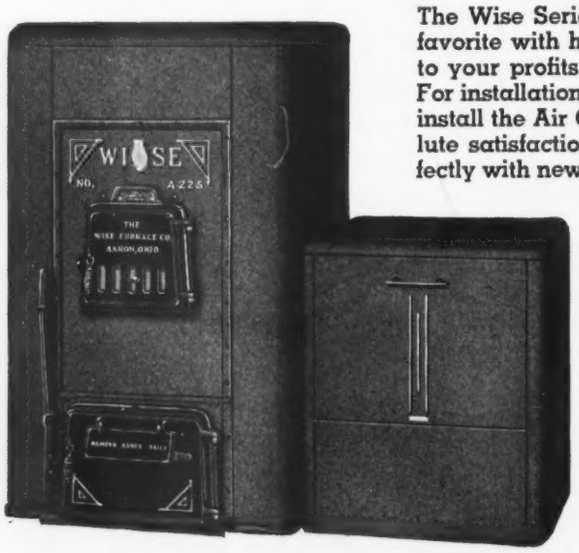
Your DEFENSE PLAN *Against*

1. Inefficient Heating
2. Expensive Operation
3. Cold Floors

☆ ☆ **WISE** ☆ ☆

FURNACES

Defense is the keynote these days . . . preparations to protect and maintain the American way of life are proceeding full speed all over the nation. A plan of defense is vital to YOU too. Defense against the common complaints and gripes which are the heritage of furnace men who don't guard against poor and inefficient heating installations. Here's our idea . . . you want to be certain all the furnaces you install perform with the utmost economy and efficiency. We're sure we can help because for nearly half a century we've been making good furnaces better as the years have increased our knowledge and experience. You can be certain when you install a Wise Series "A" Gravity or Air Conditioning Unit that you will be able to guarantee highest efficiency, economical operation and constant even warmth throughout the house each heating season for many, many years.



The Wise Series "A" Gravity Furnace illustrated at top is a time-tested favorite with heating men everywhere and you'll find that you can add to your profits many times by specifying and selling this peerless unit. For installations requiring the "last word" in style as well as performance, install the Air Conditioning Unit shown at left. It will perform with absolute satisfaction and its modern streamlined design will harmonize perfectly with new or modernized basements.

and COMING SOON—

A new addition to the famous Wise Furnace Line. A cast Iron Oil Burning Furnace to be announced later. Look for further details in a future advertisement.

Be sure to watch for it!

THE WISE FURNACE COMPANY

AKRON **OHIO**

SECURITY FOR THE FUTURE . . .

YOU CAN DEPEND ON *Randall* PILLOW BLOCKS

Today the airplane is essential for the security and defense of America.

Back of the production of more and more planes for defense is a vast industry dependent on efficient and reliable bearings. Randall Pillow Blocks represent the highest degree of security achieved in the operation of many types of equipment.

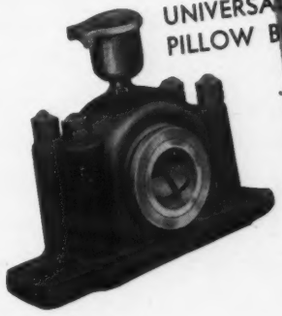
★ Randall is serving the precise demands of the home industrial front. Installed on your equipment, Randalls assure complete freedom from bearing failures.

★ Randall self-lubricating and self-aligning Pillow Blocks are dependable, trouble-free, quiet and low in cost. In the air conditioning field they are standard equipment . . . used on more air-handling units than any other. Write for free catalog.

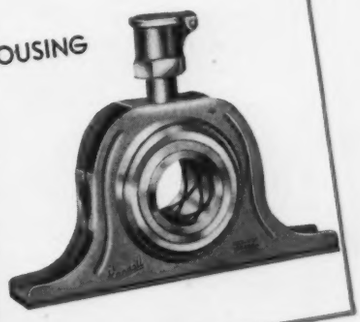
Quiet

FLANGE OR SIDE MOUNT PILLOW BLOCK

UNIVERSAL PILLOW BLOCK



ONE-PIECE STEEL HOUSING PILLOW BLOCK



Representatives Carrying Stocks

C. W. Marwedel
San Francisco, Cal.

Salt Lake Hardware Co.
Salt Lake City, Utah

Tek Bearing Co.
177 Lafayette, New York City
1192 Commonwealth Ave., Boston, Mass.

RANDALL GRAPHITE PRODUCTS CORPORATION
DEPT. 711 — 609 W. LAKE ST. — CHICAGO, ILL.

"EVER HAVE A PITTSBURGH LOCK CRACK WIDE OPEN?

Then you know why my shop prefers *Toncan Iron*"

Franck & Fric, general sheet metal contractors in Cleveland, Ohio, have been in business for 20 years, specializing in large residential work. Just recently this firm installed 10,000 pounds of Toncan Iron ducts in a home requiring 103 register openings. On a job like that, easy workability is a big factor in reducing costs and increasing profit. Here's Mr. Franck to tell you what his firm thinks about Toncan Iron.

"Not more than a half hour ago, I heard one of my boys 'cutting loose' because a Pittsburgh Lock he was forming out of ordinary steel split open. That seldom, if ever, happens with Toncan* Iron, and is one reason why my boys like to see 'specs' which read 'Toncan Iron throughout.' They know that they will have less trouble in fabrication, because Toncan Iron is soft, ductile and works easier than other metals.

"The customer benefits, too, with the use of Toncan Iron, since it is an established fact that this metal will *resist rust years longer.* I have plenty of old installations to prove that point.

"In fact, a few years ago, I made up 50 or 60 feet of gutter from several different materials, including Toncan Iron, ordinary steel, lead-coated and others. I hung it outside and, believe it or not, some of the products failed within a period of 12 to 18 months . . . but Toncan Iron was still going strong at the end of about four years! I soon discovered that it was a good convincer of Toncan Iron's lasting qualities.

"Today, on a five or six-room residence, you can usually install all Toncan Iron sheet metal for *less than a dollar* additional cost! That is what I call cheap insurance.

"The combination of ease of fabrication and long service life is about all anyone can expect of one sheet metal. As long as the firm of Franck and Fric is in the sheet metal business, you will find Toncan Iron in our shop and on our jobs."

Ask for a copy of the new and interesting booklet "How Toncan Iron Makes Money for Sheet Metal Contractors." It contains many facts that will help you build a better business.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES ★ CLEVELAND, OHIO

BERGER MANUFACTURING DIVISION
CULVERT DIVISION
NILES STEEL PRODUCTS DIVISION
STEEL AND TUBES DIVISION
UNION DRAWN STEEL DIVISION
TRUSCON STEEL COMPANY

* Reg. U. S. Pat. Off.

REPUBLIC TONCAN IRON

An alloy of refined open-hearth iron, copper and molybdenum—*that grows old slowly*

Vol. 110 American Artisan No. 7

Rearmament and Our Normal Business

ELSEWHERE throughout this issue will be found news of importance to the warm air heating—sheet metal contracting industry as such national news relates to rearmament and the effects of the rearmament program on our industry's normal business activity.

From headquarters of the National Warm Air Heating and Air Conditioning Association we have received a report of this association's recent contact with governmental agencies. Briefly, this industry was told—

1—Priorities Division, OPM, says there is no plan at present (June 14) to classify *all* industries in the U. S. If such a national classification comes about, every effort will be made by the association to secure the most favorable industry priority on the basis that rearmament workers and all workers must have warmth, a roof, and a drainage system.

2—Manufacturers of furnaces, pipe and fittings, registers, blowers, controls, humidifiers are primarily concerned with securing pig iron and steel products. The only control so far issued over these products is General Metals Order No. 1. The purpose of this order is to assure adequate raw materials to all manufacturers and limit stock accumulations beyond current requirements.

3—At present, the best method of obtaining materials is through the regular source of supply. Where this fails, a priority application can be filed (Form PD —32). On receipt of this application, Priorities Division, OPM, will consider the merits and if application is favorable issue order Form PD —32 —A.

4—Defense Housing Coordinator Palmer has said that every effort will be made to tie our industry in with the Defense Housing Building Program. Defense Housing reports 100,000 houses to be built with public funds. Contracts have been awarded for 70,000 units; 15,000 units have been completed and Defense Housing foresees a need for an additional 500 million dollars for an additional 125,000 houses.

5—Defense Housing sees a need for construction during the period July 1, 1941, and June 30, 1942, of 625,000 houses. Of these, 525,000 are needed in defense areas. Probably 125,000 will be built with public funds, leaving 400,000 to be built by private capital. Arnold Kruckman's Washington Letter discusses this program in detail.

6—A new department—Steel and Iron Division of the Office of Price Administration for Civilian Supply —headed by M. G. deChazeau has been established to determine the importance of claims for "business as usual" of industries not actively or directly engaged in rearmament. The N.W.A.H.&A.C. Ass'n has pointed out to this department that 400,000 furnaces need replacement. The department has suggested a survey of raw material requirements for this market for study by every department of government interested.

7—The recent request of OPM for sheet and strip mills to put all production possible on heavy plates will affect this industry's supply of raw materials until rearmament production reaches its peak or until new mills and new facilities go into production. Estimates of the amount of sheet and strip available for "business as usual" are, at present, only the wildest guesses and worth little consideration.

Governmental expenditure for defense has now reached 1 billion dollars monthly, will shortly reach 1½ billions a month, and is expected to reach 2 billion dollars monthly at the peak.

National income (the money earned by all the people) was 19½ billions for the first quarter of 1941. With people now possessing more money than ever before and with government curtailing products the people ordinarily would buy in good times, it is anyone's guess what the outcome will be. Economists say this situation induces inflation—the thing we are trying to avoid. When consumers have money but cannot buy goods, they bid up prices in order to get the goods they want. But, today, governmental policies have modified these normal tendencies. Prices of some commodities are being repressed and attempts are being made to stabilize prices at pre-selected levels. The result of this clashing of demand and price will be decided later.

With national income reaching 80 billions annually and with rearmament expenditures peaking at 25 billions a year, there would seem to be some 55 billions of income with which the public will seek "to buy things." Because of this, every industry like ours should seek to obtain materials, labor, manufacturing time to produce commodities the public wants in order that our country can maintain "good times."

How this can be done is still indefinite, but it is worth talking about.

Defense Developments

Changes in General Metals Order No. 1

TWO changes affecting General Metals Order No. 1, which is designed to prevent accumulation of unnecessary inventories, were announced June 23 by Director Stettinius. These changes are:

(1) The General Metals Order, scheduled to expire July 15, is extended to October 15, 1941.

(2) Customers of suppliers hereafter will not be required to file copies of their compliance affidavits with the Director of priorites. It is stipulated, however, that the customer must continue to file monthly statements with his suppliers.

◆

Suggestions For Meeting Materials Shortages

WE must make the backlog of defense orders so big that there will be an "irresistible pressure" to put every plant to work on them as soon as the plant is available, Donald M. Nelson, Director of Purchases, OPM, asserted on June 19. He also said that he believes our productive capacity can be increased a fourth or more by reducing the variety of goods offered for commercial trade. Excerpts from his address to the National Manufacturers' Association, at Pittsburgh, follow:

Since this program began, more than 41 billion dollars have been made available for defense. Contracts actually let under this program now total 16 billion, 900 million. Money paid out, to date, comes to 6½ billions. The rate of payment is rising rapidly; disbursements now are being made at a rate of a billion dollars every month, the figure will be a billion and a half by the end of the summer, and by the first of next year the best estimate is that we shall be paying out close to 2½ billions a month.

Now if it is true that we have got to have a truly all-out defense effort, it is equally true that we do not in fact have such an effort today. Our biggest immediate task, as I see it, is to bring lagging sectors up to the same level as the more advanced sectors.

How Should We Conduct Business?

We have said many times that this country cannot have business as usual until the crisis is over. We have lagged very seriously in showing people how they are to behave in an era of business *not* as usual.

A few examples will show what I mean.

We are beginning to feel acute shortages of many essential materials, particularly in the field of metals —aluminum, zinc, steel, and so on. As these shortages become acute the manufacturer who uses those materials to produce non-essential goods feels the pinch immediately. I am concerned right now with the situation of the manufacturer who can no longer get the materials he needs and who for one reason or another is not able to operate with substitutes. What happens to him?

Plants Standing Idle

The regrettable answer, as of today, is that in all too many cases, he simply has to shut up shop, pay off his labor force, and let his equipment stand idle. Such suspensions represent a waste which simply cannot be tolerated in an emergency as urgent as the one in which we live today.

Now of course it is pretty obvious that sooner or later the very size of this defense program will take up that kind of slack.

Remember—we have got to produce something like 36 billion dollars of defense goods every year. We cannot possibly do that without cutting down on production of civilian goods in every case where that production can be spared.

Many Must Shift From Civilian Goods

There are many plants in America producing what we call nonessential goods—things which our civilian economy uses in large quantities, but which we do not absolutely have to have. Many of those plants have up-to-date equipment, easily adaptable to the production of defense goods, plus skilled labor forces, plus alert and energetic managerial staffs. Sooner or later those plants are going to have to stop making what they are making now and come over into defense production. Yet here again we meet this crippling, dangerous time lag. Defense production just isn't ready for them yet.

What can be done about it? How can we translate an all-out defense program on paper into an all-out defense program in actual fact?

We have got to do several things at once.

Size Must Provide Pressure

First we must increase the all-over size of this program. We must make the backlog of unplaced orders so big that there will be an irresistible pressure to put every plant to work on defense orders the moment that plant is known to be available.

Next we must increase the tempo of the program. I am very glad indeed to be able to tell you that the Army and Navy right now are renegotiating contracts so as to advance delivery dates. As delivery dates are advanced, more and more prime contractors will be compelled by force of circumstances to subcontract their work. A manufacturer who can produce his requirement comfortably on a one-shift operation is under no pressure to do any subcontracting or to hire an additional shift; but move his delivery date ahead a couple of months and you will see an entirely different picture.

Next, we must do everything we can to increase our national capacity to produce the essential metals and other materials of which we are short. We need more steel capacity, more aluminum capacity, we need more of a great number of things if this program is to move forward properly. We can no longer afford the luxury of seeing unemployment and idle factories

appear in the midst of an all-out effort simply because we have not been able to agree whether, how, or by whom this or that productive capacity shall be expanded.

Pool of Resources Cited

We must also find some better way through which plants affected by shortages can swing over into some other sort of production, whether it be production for defense or production for the civilian trade. In part that is a responsibility of the Government; in part, too, I think it is a responsibility of industry.

It is up to each individual manufacturer to be alert and aggressive in regard to defense contracts—and by defense contracts I mean both prime contracts with the Government and subcontracts with other firms which are doing Government work. No manufacturer is likely to get many defense contracts unless he is willing to display the same ingenuity, persistence and energy in going after them that he would display in seeking any normal kind of commercial business.

What are some of the other ways in which this program is going to affect us?

Cutting Down on Varieties

I believe that one of the principal changes you are going to see is a very broad modification of the production of goods for the civilian trade. I am not now referring to shifts made necessary by shortages in metals or other materials. I mean a general, widespread, voluntary simplification of lines, styles, and models undertaken in order that we may make full use of our national industrial capacity.

Simplification Plans Under Way

There has been a good deal of study of the possibilities inherent in this sort of action recently, both in Government and among various business groups. Plans for launching such a program are being perfected, and within a very short time it will get under way. It will be done in a truly democratic way. Committees of manufacturers, distributors, and consumers will meet together to plan the ways in which simplification can be used to best advantage. I do not believe that coercion or pressure will be necessary. I do believe that the program has immense possibilities.

◆

Zinc Has Been Placed Under Full Priority Control

ZINC, a metal vitally essential in defense production, was put under full priority control June 11 in a General Preference Order issued by Director Stettinius.

The order, which became effective July 1, provides that all defense needs shall be filled ahead of all other requirements, that an emergency pool will be created to meet urgent needs, and that the remaining zinc shall be allocated among competing civilian demands. In allocating for delivery under civilian orders, the Director of Priorities will be guided by a civilian allocation program when issued by the Office of Price Administration and Civilian Supply.

Civilian Use Must Be Curtailed

Heretofore zinc has been subject only to partial control through a production pool out of which the Director of Priorities has allocated to meet emergency situations.

Available figures indicate that the total supply of zinc in 1941 will approximate from 890,000 to 950,000 short tons. The estimated requirements for 1941, however, including military and civilian needs, are now estimated at 1,165,000 short tons. This indicates an over-all shortage of from 215,000 to 275,000 tons for 1941.

Fulfilling Estimate Depends on Shipping

A factor involved in the shortage is that the total supply figures for 1941 include over 200,000 short tons which would be produced from foreign ores. However, approximately 450,000 tons of concentrate is required for this production, and any inability to get ships to move this tonnage from South America could reduce seriously the estimated supply for this year. Potential demand in cartridge brass as new cartridge facilities come in may intensify the existing tightness.

In the General Preference Order it is stated that zinc includes "all grades of metallic zinc (spelter) produced directly from ores, concentrates, and other primary material, or redistilled from scrap, including dross, skimmings, and ashes; all zinc oxide, both lead free and leaded; and zinc dust."

Defense Orders Rated A-10 or Higher

Deliveries under all defense orders, the order says, which do not bear a higher preference rating are assigned a rating of A-10. Deliveries bearing lower preference ratings or no rating must be deferred if necessary to assure deliveries for defense needs.

After all defense needs have been assured, deliveries to nondefense orders may be made so long as all terms of the order are complied with.

The order provides that during each month, beginning July 1, each producer of metallic zinc, zinc oxide, and zinc dust shall set aside from his total production an amount to be determined from time to time by the Director of Priorities, to be delivered only upon express direction from the Director. The size of this pool will be set soon for July.

Users May Request Zinc From Pool

The order provides that the zinc which remains, after the required amount has been set aside in a pool, will be equitably prorated.

Users of zinc in the forms covered by the order may make special application to the Director of Priorities for allocations of zinc from the pool set aside each month. Such applications for special allotments will be made on forms to be prescribed by the Director.

Inventory limitations are included in the order which prevent the building up of excessive stocks.

◆

Housing For Workers As Essential as Defense Materials

HIGH Government officials, headed by Vice-President Henry A. Wallace, led discussions on the "National Housing Inventory" at the convention of the National Committee on the Housing Emergency, Washington, D. C.

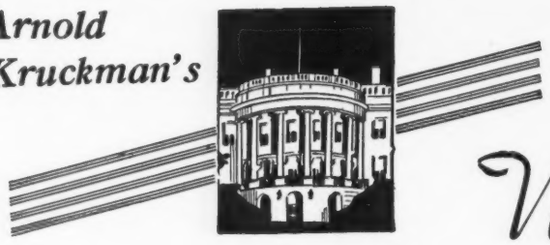
A Committee on Recommendations reported that adequate housing for workers in defense industries is as much a part of the defense establishment of the Nation as are cantonments for the armed forces or factory buildings in which to produce defense materials.

Can Be Valuable Community Asset

The report stated: "Such defense housing must be provided without delay and, if properly located,

(*Continued on page* 110)

Arnold Kruckman's



Washington Letter

The Housing Situation

AT THE moment this is written Mr. Abner Ferguson, Administrator, and his associates in FHA are waiting for the result of a survey that has been made by FHA people to determine the immediate and long-range availability of building materials. This survey will enable them to formulate policies for their own guidance. They know that zinc is practically out of circulation, that copper, like steel and other metals, has entered a scarcity stage and that lumber is teetering on the brink of scarcity.

The general idea seems to be that there is sufficient lumber immediately ahead, but that it may increasingly be difficult to secure it because largely it will have to be brought into the building areas by trucks and railways; and we know that kind of transportation sharply increases the cost; also that overland transportation increasingly is becoming difficult. The familiar old method of water transport has been cut down by the withdrawal of ships for Britain and other warwork and by the diversion of labor to the shipping for war needs.

Private Building "On the Spot"

The good people here who, at this time, have influential control, are planning curbs on all home building, aimed primarily at curtailing all non-defense home construction. These curbs consist of priorities on materials and tighter purchasing credits. It seems quite certain that priorities will come more swiftly week by week, in more all-inclusive forms. The general idea seems to be to use "shortages" to standardize and to eliminate variety of types and styles and kinds. Remember, Treasury Secretary Morgenthau demands all non-defense expenditures be held to a minimum; and Donald Nelson says there must immediately be "very broad modification of production for the civilian."

To prevent inflation, various agencies are moving to restrict non-defense installment credit, including time-payments on houses. They are directing the flow of public spending so that surplus earnings will go into defense bonds and savings stamps. OPACS, the Henderson pricing unit, vigorously opposes all installment credit, saying inflation results when you pay at increased prices for something which decreases in value as you pay. They point out there has already been a notable increase in installment business this year, 42.7% more the first quarter of 1941 than during the same period in 1940. And, says Mr. Henderson, people make the greatest use of time-payments in those lines in which shortages occur the earliest.

Officially we are told by FHA that new homes started under FHA underwriting range from 20% to 25% more units per month than they did last year. Approximately 100,000 units were listed the first six months of 1941. It is estimated the coming months will run something like this: July, 22,000; August, 21,500; September, 20,000; October, 22,250; November, 18,100; December, 14,000. This roughly would approximate 125,000 units

Low Cost Houses Predominate

The bulk of this building is houses selling from $2,500 to $3,500. Buildings in this cost-range, we are told, constitute approximately 70% of all FHA current underwritings. Over 75% of all houses cost less than $6,000. And over 85% of all FHA underwritings are for houses built in the 168 defense arease designated by the President.

About 30% of the housing is being built under the new Title VI, which underwrites 90% of the cost of the structure and permits the builder to bear the relation of mortgagor for the balance, which he collects from defense workers as rent, or in installments. Operations under Title VI are permitted only in areas designated by the President. The largest part of the other underwritings are made under the terms of Section 203 which limits 90% mortgages to owner-occupied new homes. Under Title VI, incidentally, mortgages are limited to a maximum of $4,000 on a single-family home; $6,000 on a two-family home; $8,000 on a three-family home; and $10,500 on a four-family home.

FHA statistics show that 12,946 applications representing a potential expenditure of $47,019,200 were filed from April 12 to May 31, under the new Title VI. During a parallel period the applications under Section 203 totaled approximately $100,478,327. It is reported that from July 1, 1940, to May 10, 1941, the number of small FHA homes started numbered 158,277, practically all in industrial centers. FHA people formally declare they have not been aware of any tightening of credit.

Better Heating Wanted

Robert Thulman, FHA's heating and plumbing expert, states that he is not aware there is any difference in the basic metabolism of people who live in houses that cost different prices; and with that assumption as a starting point he believes that one person normally requires as much warmth as another. It is his belief that those who provide heating plants for FHA houses should start with the theory that a family with $1,800 a year income must have the same fundamental heating service that is required for the family, comparably per square foot, that has a million dollar income.

He stresses this statement to make clear that he thinks there is little difference in the type of heating equipment that should be placed in the home built under the various cost-range classifications of FHA. He urges that all the warm air heating industry, as soon as possible, adopt the uniform test code as it was adopted by the National Warm Air Heating and Air Conditioning Association at its recent meeting. It is his further suggestion that the warm air heating industry should get itself a code, and that the spot temperature criterion of comfort should be limited. He particularly lauds the Yardstick issued by the Association, says it is a fine thing, and urges it be placed in all hands where a warm air heating system is under consideration.

The warm air heating requirements, published in *The American Artisan* for May, under trial in the

(*Continued on page* 100)

AMERICAN ARTISAN

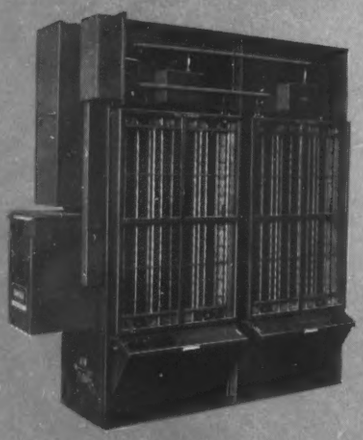
RESIDENTIAL AIR CONDITIONING

SECTION

DEVOTED TO HOME AND SMALL COMMERCIAL AIR CONDITIONING

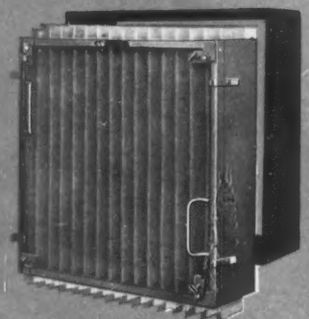
MODERN DUST CONTROL

On Parade



ELECTRO-MATIC air filter combines electrical precipitation with automatic air filtration to obtain highest efficiency in the removal of atmospheric dust, smoke, vapors and welding fumes. Bulletin 250C.

AMERICAN AUTOMATIC self cleaning filter is ideal for most large ventilating and air conditioning installations. Provides multi-stage air cleaning by means of filter media of graduated density. Bulletin 241.

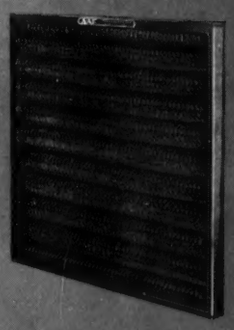


AIRMAT TYPE PL dry filter is designed for ventilating and air conditioning service where dust concentration is not abnormal. Its advantages of high cleaning efficiency, low initial resistance, and large dust holding capacity make it applicable to more types of air cleaning service than any other filter. Bulletin 230B.

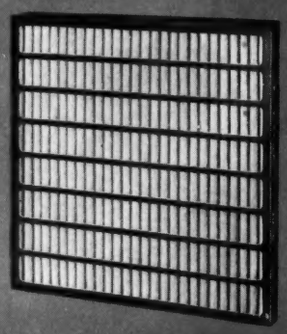
The AAF line of air filters for domestic and commercial air conditioning and warm air heating systems has been developed through more than 20 years experience in this field. No one filter can be universally applicable to all conditions and for this reason, each AAF filter has certain inherent advantages which define its most practical application. Clean air at minimum cost does not necessarily mean the cheapest filter that will answer the purpose, but the type that meets the requirements in the most economical manner.

We have issued bulletins covering the specifications and advantages of each of the filters shown on this page. These bulletins are available without obligation for your use. Please ask for them by the number shown under each filter description. Address 142 Central Avenue, Louisville, Kentucky.

AMERICAN AIR FILTER CO., INC.
INCORPORATED
LOUISVILLE, KENTUCKY
IN CANADA: DARLING BROS. LTD., MONTREAL, P. Q.

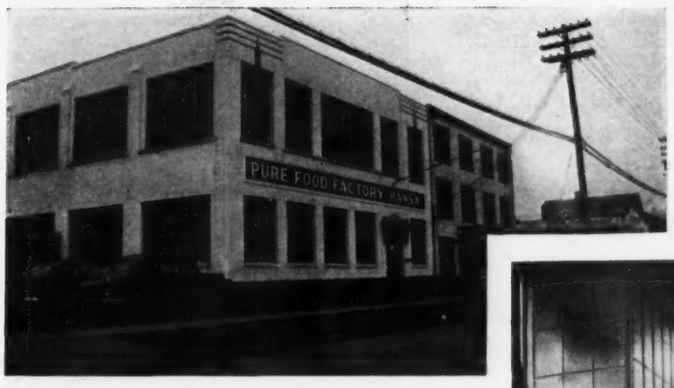


THROWAY, as the name implies, is designed to be discarded after it has collected its full dust load and replaced with a complete new unit. Low first cost and simple maintenance makes it particularly applicable to warm air heating or domestic air conditioning systems where cost of replacement due to small number of units required does not represent a large item of expense. Bulletin No. 117E.



TYPE G DRIFILTER is an inexpensive, replaceable filter in which bonded fibre glass material that has proved so satisfactory in Airmat filters is used as a filtering medium. Its outstanding advantages in addition to being odorless, flame-proof and cleanable are its high efficiency in dust removal and low resistance to air flow. Bulletin No. 57.

A/C WASHABLE FILTER is a permanent type filter having high cleaning efficiency and greater dust storage than the Throwaway or similar types of renewable filters. Can be cleaned and re-viscoained at a cost of 5c. Bulletin No. 77.



Left — Exterior of the building and, below— One of the air conditioning units for the factory. See factory plan following.

Air Conditioning in a Bullion Cube Plant

By R. C. Nason

As a straight line is the shortest distance so, also, air conditioning may be the most effective when it likewise is the most simple. In proof is considered to be a recent installation by the County Refrigeration Service, Inc., Mt. Vernon, N. Y. in the Pure Food Co., Mamaroneck, N. Y., to prevent the undesirable de-jellying of beef, lamb and chicken bullion cubes in summer.

E. J. Chevalier, engineer of the air conditioning contractor, outlined conditions as he found them prior to the installation of his equipment. At this plant, he revealed, the mixing and packaging departments were in a general room 50 ft. by 100 ft. by 12 ft. ceiling. Three sides, south, west and north, are 75 per cent glass while two 6 ft. by 8 ft. entirely glassed monitor skylights permitted substantial sun radiation as well. The fact that this room is on the top floor also presented yet another cooling obstacle.

Conditions Prior to Conditioning

The steam-jacketed mixers released considerable heat and steam, while the large glass exposure from south and west sides of the cubing, wrapping and packaging operations area added to the heat load in summer. The combined factors as just cited forced employees to work in 110 deg. Fahr. temperature. Heat derived from food mixers might have been mitigated somewhat by hooding these machines, but this probably would not have remedied the overheated condition in the packaging department due to its unusually large exposure.

In winter, employee comfort and food conditions were satisfactory meaning in this case ability of the $\frac{9}{16}$-in. square food cubes to remain jellied following their formation by multiple-unit machines. Yet, in summer the management lost large sums in wasted time and necessity of repeating processes.

The extreme heat sent the 30 girls who work here to rest rooms frequently, while the jellied cubes merged, thus making cubing, wrapping and packaging difficult and at times almost impossible. Tracing processing operations further, it might be explained that following mixing and jellying the product is fed to 8 cubing machines. As cubes leave these machines operators wrap them first in wax paper and then in aluminum foil. Subsequently cubes are packaged for retail sale in metal cans.

Multi-Unit System Recommended

Having observed all elements of the problem, Mr. Chevalier recommended the construction of a ceiling-high partition between mixing and packaging departments. (See factory plan). This now cuts the room into two nearly equal areas each 50 ft. by 50 ft. To remove heat, steam and odors from mixers the contractor installed two 24-in. roof ventilators with fans.

For the packaging room the engineer suggested unit conditioners rather than a complex duct system as units appeared simpler and equally satisfactory.

The resulting apparatus as installed consists of two self-contained heating, filtering, dehumidifying and cooling units of 5 tons capacity each. These were placed on the floor on opposite sides of the room to discharge towards the center of

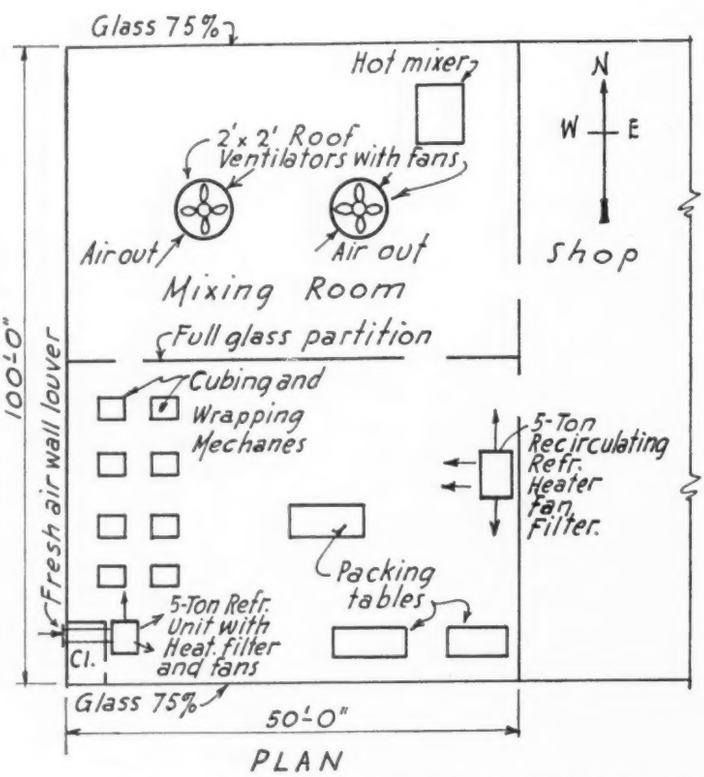
the room. One unit has a special side opening that discharges towards the cubing and packaging machines. One unit was placed near the southwest corner, the other centrally, against an inner east wall. (See factory plan.)

Winter operation of the equipment varies somewhat from summer usage in that steam heat is turned on in one of the units during winter and adequately warms the room without use of the similar heating sections of the other unit or use of an overhead unit heater of conventional pattern. Refrigeration is not in use in winter in either unit.

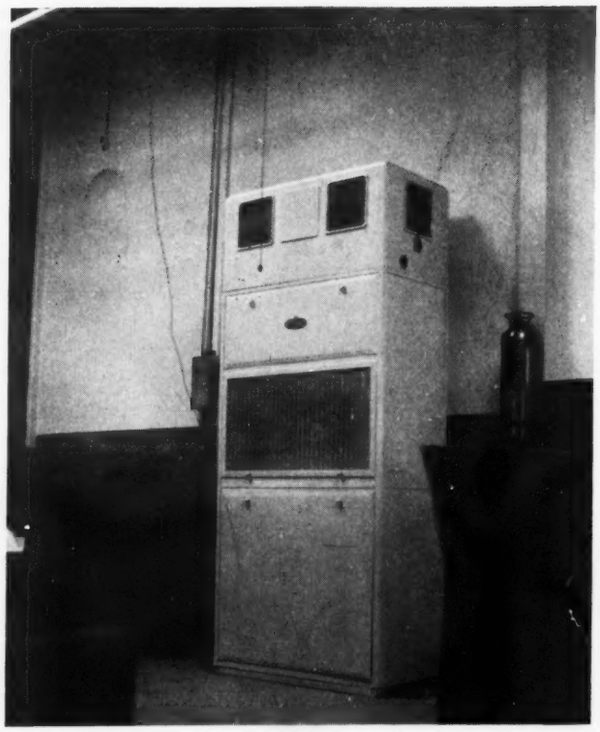
Although the interior-placed unit may be used for recirculation (there being no fresh air connection) the outside corner unit derives its air supply from a connected 8 in. by 12 in. fresh air duct and through wall louvered opening. Sectional, viscous filters in both units screen out atmospheric dirt.

Ventilating and Cooling Provisions

The ventilator fan capacity of the previously discussed mixing room fans allows a 2½ min. air change, but change frequency is more moderate in the packaging room. This would be a 7½ min. air change if outer-air made up the total of the 4,000 cu. ft. per minute handled by the twin-fans of the two units. But, in point of fact room air change occurs every 15 minutes because one unit is recirculating.



The two 5-ton units are located in the packing room as shown. The partition suggested by County Refrigeration Service confines the high temperatures of preparation within the mixing room where adequate ventilation is provided.



Second 5-ton unit in the packing room. This unit can heat, but was not needed last winter when one unit provided sufficient heat.

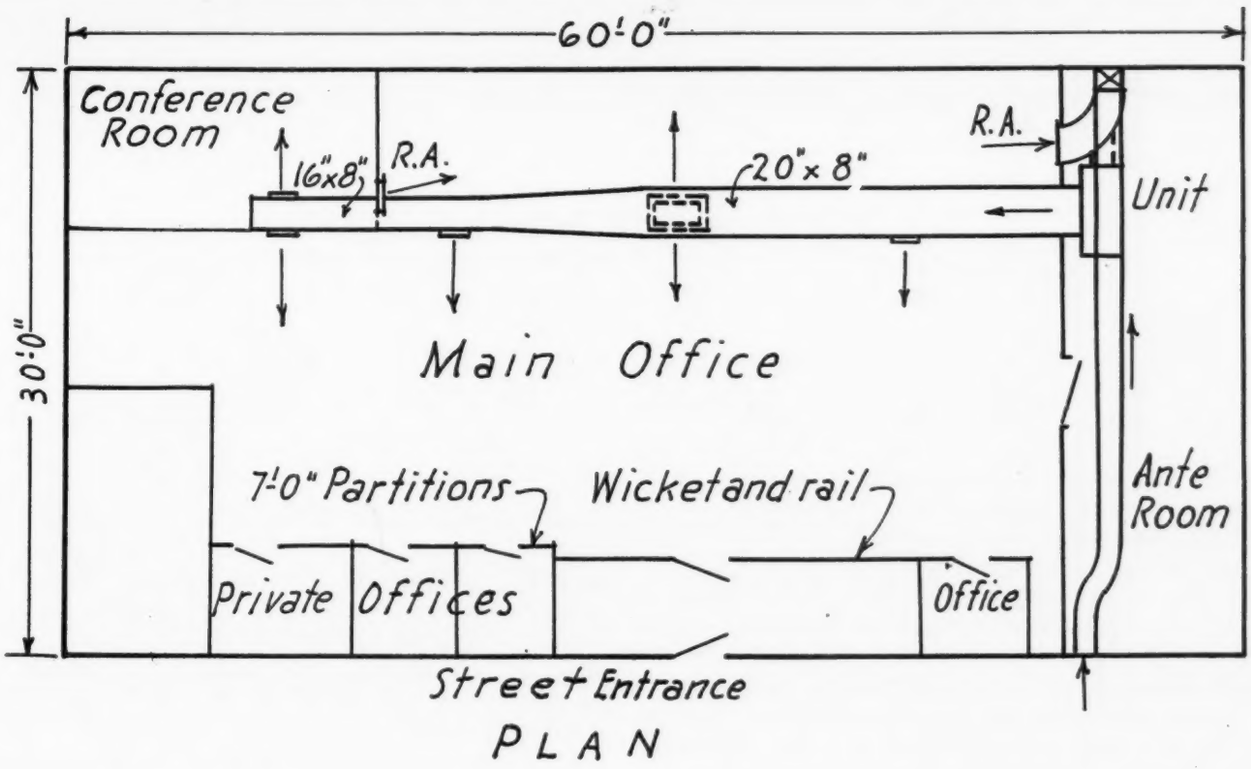
The engineer based his refrigeration load requirement on the basis of 1 ton per 3,000 cu. ft. of contents, for each unit is rated at 5 tons. Room contents are 30,000 cu. ft. Air temperature at the units ranges from 68 to 70 deg. and cooling effect is provided to maintain 80 deg. Fahr. and 50 per cent R.H. when outdoor readings are 95 deg. dry bulb and 75 deg. wet bulb. One unit serves admirably in moderate weather. Both are turned on in hot weather.

Windows formerly opened in summer now are kept closed the entire year. Ventilators in the sides of the two 6 ft. by 8 ft. skylights are kept closed and shades are provided for summer use. Extra and unused additional ventilation in this room was also provided by the sheet metal contractor, Frank Sims, Mt. Vernon, N. Y., as four 1 ft. by 1 ft. roof openings. These are, however, kept closed.

Excellent Results Obtained

Operation of the units is automatic, according to wall thermostatic control. Employee comfort is assured, many hours formerly spent in rest rooms now are usefully applied in work processes. Wrapping and cubing progress without hindrance. The finished product is perfect. Time formerly devoted to rejellying disintegrated and run-together material now is nil.

So pleased was the management that the County Refrigeration Service also was awarded a contract to fully air condition the general office on the first floor under the packaging department.



Above—Plan of General Office on the first floor where a remote unit with duct distribution serves general and private offices.

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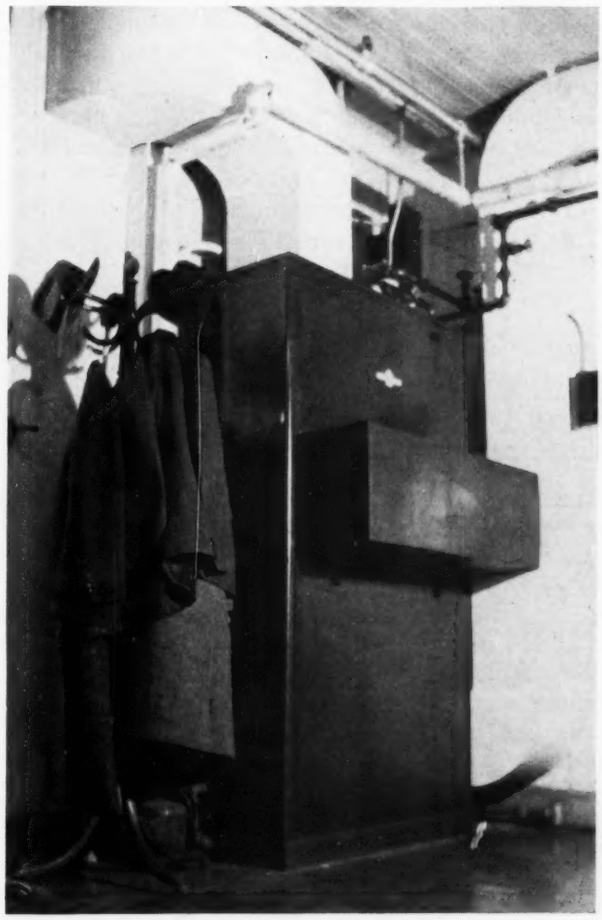
Below—The General Office unit has a cooling capacity of 3 tons and is also used for heating in winter. The duct system is shown in the plan above.



The same type of apparatus was used here but placed in adjacent anteroom. (See office plan.)

Air supply is a mixture of recirculated and fresh of which 250 cu. ft. per minute is recirculated and 500 cu. ft. per minute is fresh derived from a low, wall grille in the office wall near the unit. Proper dampering permits the use of all-fresh in summer or, again, enables use of 100 per cent recirculation in severe winter weather if necessary.

The Office System

The supply trunk from the unit passes through the office wall and is ceiling-hung. Openings into the main office are three in number, 6 in. by 12 in. each placed in the side of the duct except in one instance where there is an underside grille with supported, flat distributing impingment plate. This opening, 12 in. by 12 in., is opposite the front entrance.

In addition to the general office there are four small private offices with 7-ft. partitions on the street side plus a rather long conference room in an interior corner. As one of the walls of this room encloses the supply duct, the duct has two openings opposite each other and each 6 in. by 12 in. Discharge from one is to the conference room, discharge from the other is into the general office. The conference room has a baseboard return air grille 18 in. by 18 in. that allows smoke removal during meetings with closed doors. This return air stream passes through the general office to the recirculation grille (also 18 in. by 18 in.), near the air conditioning unit. (See office plan.)

(*Continued on page* 56)

Short Form for Estimating

The Cooling Load

By F. O. Jordan
Registered Consulting Engineer, Detroit

QUITE a lot of old timers in the air conditioning business insist that shortcut or time saving methods cannot be successfully applied to air conditioning load estimates. They base this conclusion on the premise that each and every air conditioning job involves its own peculiar combination of problems to the extent that it requires a complete analysis all its own.

Is the old timers' conclusion correct?

Well, this much we know. We have learned one answer during the late disappointing period of slow growth in volume of small air conditioning installations. If every purchaser of a small commercial air conditioning job must retain and pay for the services of an expert engineer either indirectly or otherwise, we may as well forget all about air conditioning ever becoming anything like a really big industry. If even the small job of a few tons cannot be successfully engineered briefly, air conditioned comfort in the good old summer time will always be too expensive to realize the volume required to place air conditioning among the industrial leaders.

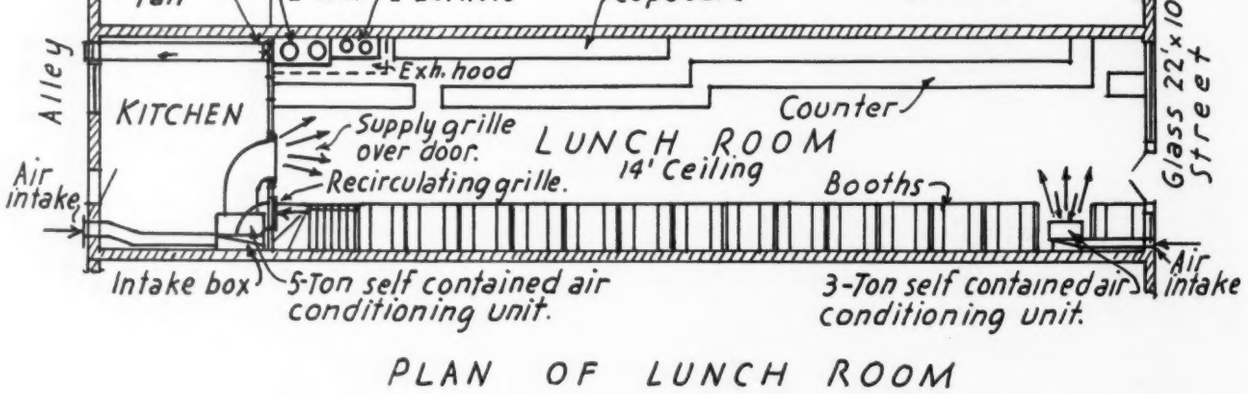
In a few words, the short cut form for estimating loads with a reasonable degree of accuracy is the *only door to success.*

Why Short Cuts Are Close Enough

Or course it is true that every air conditioning job does offer a few problems all its own. However, air conditioning jobs fall naturally into a few classifications based upon type of occupancy or usage. In each of these classifications, certain types of load sources are invariably heavy, while certain others are always unimportant. Hence it is possible to devise short cut forms which deal with characteristically heavy load sources with suitable exactness, and which dismiss the unimportant items with quick factors without sacrifice of accuracy. Of course differences in degree of intensity of load factors will be taken care of by the factors used in the forms.

Such methods save a lot of time and money otherwise spent in making estimates. Even though they may not be quite so mathematically exact as the complete analysis, they invariably are close enough to result in the same equipment selection, because each model of the line must of necessity cover a considerable range of capacities.

And remember—(a) simple short cut methods can be learned by almost anyone, and (b) they give everybody more time to be out making sales.



PLAN OF LUNCH ROOM

The cooling load for this typical small lunch room has been calculated by this short form method. The load is entered on the Heat Gain Sheet. The text expains how each item is calculated quickly, but with sufficient accuracy for the average range of equipment sizes available.

Short Cut Form

For Lunch Rooms north of the Mason-Dixon Line with heaviest load during the noon hour.

Sensible (Cooling) Load

1.	180 People at Noon Hour × ½ Hr. Av. Occupancy × 420	= 37,800
2.	2 Gas Burners × 50% Use × 50% not exhausted × 6,000	= 3,000
3.	.... Watts Elect. App. × ..% Used × ..% not exhausted × 3	= .....
4.	2 Urns × 100% Used × 50% not exhausted × 5,000	= 5,000
5.	.... Cu. Ft. Oven × ..% Used × ..% not exhausted × 800	= .....
6.	.... Sq. Ft. Steam Table × ..% Used × ..% not exhausted × 200	= .....
7.	.... Sq. Ft. Uninsulated Roof—no attic × ..% for color × 30	= .....
8.	.... Sq. Ft. Insulated Roof—no attic × ..% for color × 10	= .....
9.	.... Sq. Ft. roof with attic × ..% for color × 5	= .....
10.	88 Sq. Ft. Outside Wall × 4	= 358
11.	308 Sq. Ft. Light Interior Partition × 4	= 1,232
12.	220 Sq. Ft. Glass with awnings exposed to noon sun × 35	= 7,700
13.	.... Sq. Ft. other Windows × 15	= .....
14.	2200 Sq. Ft. Ceiling × 3	= 6,600
15.	....	.....
16.	.... Entire Sensible	= 61,690

Latent (Dehumidifying) Load

17.	180 People at Noon Hour × ½ Hr. Av. Occupancy × 380	= 34,200
18.	2 Gas Burners × 50% Used × 0% not exhausted × 3,000	= 0
19.	.... Watts Elect. App. × ..% Used × ..% not exhausted × 1	= .....
20.	2 Urns × 100% Used × 0% not exhausted × 5,000	= 0
21.	.... Cu. Ft. Oven × ..% Used × ..% not exhausted × 200	= .....
22.	.... Sq. Ft. Steam Table × ..% Used × ..% not exhausted × 200	= .....
23.	....	.....
24.	Entire Latent	= 34,200

25.	Total Btus (Item No. 16 plus Item No. 24)	96,160
26.	Total Tons (Item No. 25/12,000)	8
27.	Ratio Latent to total ($\frac{100 \times \text{Item No. 24}}{\text{Item No. 25}}$)	35%

28. Coil Depth @ 85° DB & 70° WB = 4 Rows of Tubes
29. Ref. Temp. @ 85° DB & 70° WB = 40°
30. Tons/sq. ft. Face Area or Per Air Cond. Unit = 3 and 5 per cond.
31. Number of Sq. Ft. Face Area or Air Cond. Units = 2 air cond. units
32. Size Suction Tubing ..... Inches.
33. Suct. Press. Drop from Air Cond. to Compressor ..... Lb/sq. in.
34. Size Liquid Tubing ..... Inches.
35. Liquid Press. Drop from Compressor to Air Cond. Unit .... Lb/sq. in.
36. Suction Pressure at Compressor ..... Lb/sq. in.
37. Tons Capacity Compressor ..... and head pressure ..... Lb/sq. in.
38. Model Nos. Air Cond. Units or Coils 35C and 53C.
39. Model No. Compressor .....

A Lunch Room

For example, there are tens of thousands of lunch rooms, enough of them to offer a very attractive field to the air conditioning man—if he is the first man who makes the lunch room owner a proposition priced low enough to pay out.

In lunch rooms the following is always true:

1—Internal loads composed of occupancy, outside air and cooking appliances are practically the whole load.

2—External loads consisting of transmission and sun effect are light to negligible.

Obviously, the loads under item No. 1 hinge upon the occupancy. On the other hand the loads under item No. 2 are so relatively unimportant there generally is no need even to note the type of construction. In fact, one generally will be in the running if he calculates the total load on the lunch room well exposed to the sun by multiplying the peak hour occupancy by 1200 Btus, and the occupancy of the shaded lunch room by taking the equivalent number of hour-occupants times 1000 Btus.

However, there may be exceptional jobs where such extreme simplicity would spell trouble. Therefore, the writer has devised and made use of such forms as Chart 1 for the various types of installations.

How It Works

In the first place, note that this form and its factors are for lunch rooms with the heavy load during the noon hour located in the northern part of the U. S. A. It is a typical lunch room where office and factory workers lunch at noon.

Item No. 1: First we must multiply the total number of customers during the noon hour by the percent of an hour they require for lunch. This shows the equivalent number of people present for one hour. This figure is multiplied by 420 Btus, which is the number of Btus of sensible heat given off by one average person plus the heat removal required to cool the 800 cu. ft. of outside air required per hour per occupant under these conditions to keep the odor content down.

Appliance Load

Items No. 3 to 6: Here we calculate the appliance loads by multiplying the appliances by the heat given off by each, taking into account the per cent of usage during the noon hour and the per cent of the sensible heat removed by the exhaust fan through the hood over the appliances. If the appliances are covered with an exhaust hood through which air is exhausted mechanically, it is safe to assume that about 50% of the sensible load and all of the latent load are exhausted. On this particular job it was found that the urns were in use full blast during almost the entire noon hour, although it is often found that the coffee is made before noon and the urns are heated during the noon hour only enough to keep the beverage warm. As noted on the form, it was

found that the short order burners were in use only about half the time, so another 50% was taken off for this.

Items No. 7 to 9: Here the heat gain due to transmission and sun effect are calculated for the three most common kinds of construction found in this class of building. The factors given are for black roofs. They should be multiplied by 75% for light colored roofs and by 50% for white or aluminum. Unless there is a second floor above, sun effect generally should be calculated on these noon day lunch rooms. This is true because the comparatively short "lag" in time for the sun's heat to pass through the roof construction usually found above them allows the maximum heating effect of the sun to penetrate before the customer loads fall off sharply around one o'clock. However, it is unnecessary to consider the sun's heat through the south wall, because the lag of the wall will keep the noon sun effect out of the building until well along in the afternoon when the customer and other loads are light. Of course sun effect through the south windows must be included. Since this lunch room is located in a three-story building, transmission only occurs on the ceiling, and is calculated in Item No. 14.

Items No. 10 to No. 14: These items are self explanatory. Of course the only glass that can be "exposed to noon sun" is a south window or a skylight. Hence a smaller factor is used for other glass. There is no factor given for heavy interior masonry partitions because of their storage effect. In lunch rooms where the peak load is characteristically short and intense, heavy walls actually help carry the load over the peak if they are well cooled by pulling the temperature down some time before the heavy load period at noon. On other types of occupancy where the heavy load lasts for hours, loads through such partitions demand attention.

Item No. 16: Here we total the sensible, or cooling load.

Latent (Dehumidifying) Load

Item No. 17: The factor of 380 used in calculating the latent load due to the occupants includes the moisture load from the occupant directly, plus the moisture carried in with the outside air he requires for ventilation.

Items No. 18 to No. 22: Here the fact is brought out that there is no latent load from the appliances because all the steam is carried away from them by the mechanical exhaust through the hood.

In Item No. 26, the total tons works out as 8, so we selected one 3 ton and one 5 ton self contained air conditioning unit complete with compressor, condenser, cooling or air conditioning coil, fan, and air filter. This popular type of unit requires little more installation than a radio, and may be taken along as easily by the owner when his lease expires.

Selecting the Coil

Item No. 27: The latent to total ratio is calculated here because this ratio or one of its corollaries such as the sensible to total ratio or "multiplier" determines the coil temperature and depth for a given entering air condition. The coil and its operating temperature are selected upon the basis of 85 degree dry bulb and 70 degree wet bulb temperature because this is just about the temperature of the mixture of air recirculated from the room when it is comfortable in the summer and the outside air taken in the quantity required for ventilation. For this job, a four row coil at 40 degrees gives the best combination of performance characteristics. A deeper coil would permit the use of a higher coil temperature which would raise the refrigerating capacity of the compressor, but a higher hence noisier fan speed would be required to overcome the resistance. A shallower coil would be cheaper and would help out on the fan speed, but would require a lower temperature to get the required moisture removal, and so would penalize the compressor.

Several of the items from No. 32 on, are given for use when a central system with remote compressor is to be installed.

The Result

The result of these calculations is shown in the plan view. The three ton unit was located where it blows across the south window and door and "knocks down" the sun load and so presents a cool oasis which draws customers into its cool interior from the hot sidewalk. It takes in a percentage of outside air through a duct from the front wall. The five ton unit is located in the kitchen and is directed so it blows the length of the lunch room proper, spreading a cooling breeze over the customers as they eat. It takes air from the lunch room and also from the outside through a duct at the kitchen ceiling.

Quick Engineering Increases Sales

This short cut form can be used to put the wallop into the salesman's efforts. Nothing is more disheartening to the prospect who is "hot" for air conditioning than the long wait while the sales and engineering departments get together on the analysis and get out a proposal. But when armed with a short cut form like this, any bright salesman with little or no experience can do the required engineering on the job, present his proposal while the prospect is "hot," and walk out with the order.

A Short Method Technical Code

This simplified Technical Code was developed by Vorys Brothers to aid their customers engineer better jobs in shorter time. The code has been in use for several years, in designing thousands of installations, with excellent, trouble-free results. Research Residence staff engineers have been favorable because this code follows the Technical Code and, for the same size house recommended, the results are the same.

By Newt T. Hess

Heating and Engineering Supervisor, Vorys Brothers, Inc., Columbus, O.

THE Technical and Mechanical Codes are the accurate methods of figuring heat loss for winter air-conditioning installation. However, these methods are complicated to the average furnace man who has been installing gravity jobs.

To simplify the engineering of these jobs we developed a short method Technical Code. This method is primarily the Technical Code. It is not a "rule of thumb" method. This code is simplified by combining factors and calculations to meet standardized conditions and the result is that this method has shortened the time required to figure an average job to the absolute minimum. You can secure the furnace and fan size, the CFM required in each room, and your pipe size factors complete in about twenty to thirty minutes. ALL the mathematics required is simple arithmetic.

In developing this code we had in mind only the general run of average houses. We admitted that a large church job or a mansion should not be figured with this simplified method. However, today it is the 4-5-6-7-8 room houses that make up the bulk of new construction. These houses are all of standardized construction, of simplified, liveable design. They are not complicated by peculiar combinations of materials, nor involved architecture. We include as a part of this code the assumption that the workability be limited to eight room or smaller houses, and figured the en-

HEATING ESTIMATE SHEET

Job: School
Customer:

Room	1st Floor							2nd Floor				Basement	Total
	Living	Dining	Kitchen	Hall	BR No. 1	BR No. 2	Bath	BR No. 1	BR No. 2	BR No. 3	Bath		
Cubic Contents	2160		1000		1352	1296	464					1950	8222
Glass and Doors	3534		2418		1736	1488	372					744	
Walls	4824		3744		3744	3672	936					7190	
Ceiling	1620		750		1014	972	348						
Floor												5720	
Infiltration	3240		1500		2028	1944	696					2925	
Exposure													
Room Loss Totals	13218		8412		8522	8076	2352					16579	
Total Heat Loss													57159

Total CFM = cubic contents ÷ Factor = 8222 ÷ 10 = 822 CFM @ reg + 15% = 945 CFM at Fan.
Air Delivery Factor = CFM ÷ Total Heat Loss = 822 ÷ 57159 = .014 +
CFM each room = Air Delivery Factor X Heat loss each room — enter answer below.

CFM each room	185		117		119	113	33					232	
Equivalent length													
Square Inches Pipe	56		35		36	34	10					70	
Warm Air													
Size Pipe	2—3¼x12		3¼x12		3¼x12	3¼x12	3¼x10					2—3¼x12	
Size Register	12x6		12x6		12x6	12x6	10x6					12x5	
C. A. Return													
Size Pipe	2—3¼x12		3¼x12		3¼x12	3¼x12						3¼x14	
Size Register	12x6		12x5		12x6	12x6						14x6	

COSTS

Furnace
Fittings
Fan
Registers
Miscellaneous
Smoke Pipe
Outside CA 14x6 3¼x14 8" Rd.
Controls
Freight
Total cost materials

tire code on a temperature rise of 70 degrees.

Figure Heat Loss

I. Determine heat loss each room as follows:

			Wall Insulation		
			None	½"	3⅝"
1. sq. ft.	Glass and door	×	62	66	73
	Storm windows	×	35	39	46
2. sq. ft.	Exposed wall				
	Not insulated	×	18		
	½" insulation	×	14		
	3⅝" insulation	×	7		
	Concrete walls:				
	Below grade	×	25		
	Above grade	×	40		
3. sq. ft.	Ceiling and exposed floors, where no heat in attic or basement				
	Not insulated	×	22		
	½" insulation	×	17		
	3⅝" insulation	×	6		
	Concrete basement floors	×	22		
4. cu. ft.	Volume (infiltration)				
	Average exposure	×	1½		
	Unusual exposure	×	2		

II. Add together answers resulting above = heat loss of room.

III. Add together all room heat losses = total house heat loss.

Size Furnace

IV. Supply furnace which has Btu heat output at register equal to total heat loss above.

Size Fan

V. Total cubic volume of heated rooms.

÷ by 9 one floor uninsulated houses. (6-7/10 air changes per hr.)

÷ by 10 partially insulated or 2-story uninsulated houses (6 air changes per hr.)

÷ by 12 fully insulated houses. (5 air changes per hr.)

This answer is cu. ft. per minute fan must deliver at register. (Use this answer to figure room cfm as shown below.)

Add 15% for pressure losses and supply fan having this output.

Obtain Air Delivery Required Each Room

1. Divide total cubic feet per minute of air required at register (result from V) by total heat loss of house.
   Result is cfm factor used below.
2. Multiply cfm factor × heat loss of room = cfm required by each room.

As we mentioned before, the code is based on 70 degree temperature rise. We further simplified the code by subtracting the wall factors from the glass factor instead of subtracting the glass

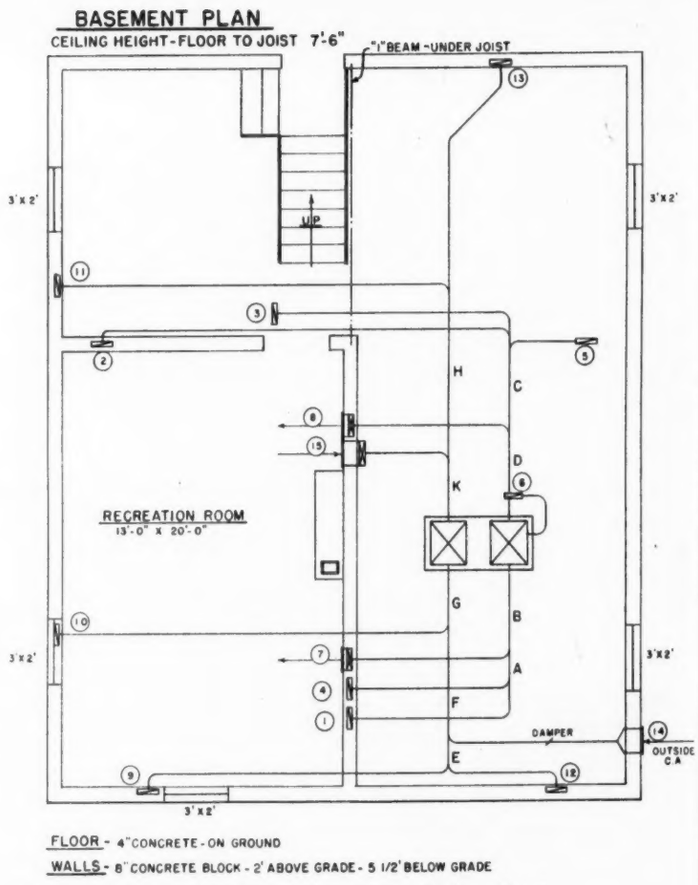


Fig. 1—Plan used in Vorys Bros. Inc., dealer school to size main, branch and riser sizes and locate runs of pipe for minimum metal.

area from the gross wall area, in order to get the net area of the wall and then figuring the heat loss of the net wall.

Example

Glass

1.13 — Btu loss per sq. ft. per deg. temp. rise per hr.
× 70 — Temp. rise.

79.1 — Btu per sq. ft. loss @ 70 deg. temp. rise.

In our code we simplified this and called it 80 Btu per square foot of glass per hour. Therefore, our glass factor is actually 80.

Wall—Standard Construction

.25 — Btu loss per sq. ft. per deg. temp. rise.
× 70 — Temp. rise.

17.50 — Btu per sq. ft. loss @ 70 deg. temp. rise.

In our code you will note that this simplified to 18.

If we figure the *total* area of the exposed wall instead of deducting the area of the glass, then we have figured the glass as though it were solid wall, or have used then a factor of 18 for the windows. It then follows that, instead of deducting

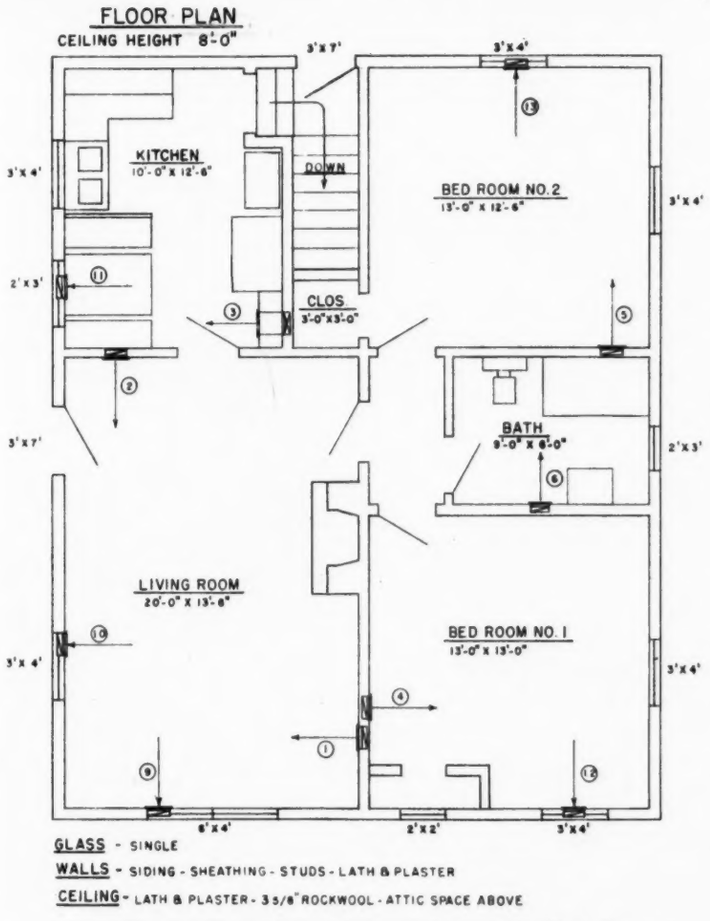


Fig. 2—Floor plan of house calculated in Heat Loss Sheet showing selected location of registers and returns and their sizes.

the glass from the wall, we can figure the total wall and then by deducting the wall factor from the window or glass factor and using the resulting factor for the glass, we save this calculation on every room in every house. In our code we have figured the glass as 80 less 18 or 62. This factor, of course, will change with changes in the wall construction and you will note that these various factors are all shown in the simplified code.

Use the total area of the exposed wall and multiply by the wall factor. Use the area of the windows and multiply by the correct window factor. Factors are given for ½" insulation, which is also the factor to be used when insulating lath or sheathing is used, or for thin blanket insulation.

The ceiling and floor factors are figured in the same manner, allowing, of course, for the accepted temperature rise through ceiling to attic and basement to ground, etc.

The only factor that is not taken from the Technical Code is the factor for infiltration. For this factor we have gone to the Mechanical Code and accepted the fact that average conditions produce an air change once an hour.

We know that .018 Btu will raise one cubic foot of air one degree; or .018 × 70 or 1.26 Btu will raise one cubic foot of air 70 degrees. To this we added a safety margin and said that 1½ Btu per cubic foot of heated space would be required to heat the approximate one air change per hour due to infiltration, etc.

That is, cubic volume × 1½ = Btu per hour required due to infiltration. To allow for unusual exposure, that is, a room exposed on three sides with windows on all three sides, such as sunrooms, sleeping porches, etc., we have developed the factor 2 which should be used for rooms having a very large glass area in ratio to the volume of the room.

Finding Fan Capacity

After securing the heat loss for each room and adding them together to secure the heat loss of the entire house, thus finding the required furnace rating, the next step is to find the size and capacity fan required.

In figuring the heat loss due to infiltration it was necessary to find the cubic volume of each room. This figure should in each case have been saved for reference at this time. Add together the volume of each of the rooms to get the total volume in the house to be heated. You will note that different factors are given for different construction. This is necessary, as a large insulated house will require less heat in proportion to its size than a small uninsulated house. Therefore, if the same factor is used for all, it will result in too low a register temperature on the insulated job and too high a temperature on the uninsulated job. The factor 9 will result in an air circulation every nine minutes or 6.7 times an hour. The factor 10 will be six times an hour and factor 12 will be five times an hour.

Dividing the total volume by the factor you will secure the total cfm required. We have found it well to add 15% to this figure to allow for losses, which will give a safety margin in sizing fan.

Determining Room CFM

The next step is to find the cfm factor. This is done exactly the same as the Technical Code. Divide the total cubic feet of air per minute required, as above determined, by the total heat loss of the house. (If you desire to check the resulting register temperature this may be done by referring to the cfm factor table of the Technical Code.) The factors which have been developed seem to always result in a temperature within the allowable range.

The final step is to secure the cfm required in each individual room. This is also accomplished as in the Technical Code; by multiplying the heat loss of the room by the cfm factor, which you have obtained as instructed in the previous paragraph.

Simplified Duct Design

After developing the simplified method of figuring heat loss we found it would be a further help to have a simple system of duct design. This has been developed by us for use particularly with our Simplified Code. During the past two years this system has been widely used throughout Ohio and has met with complete success.

This system, too, was made to fill the popular demand for an easy system applicable to the average house job. It is recommended only for houses of 8 rooms or less. For larger buildings, the Technical Code or the various pre-fabricated fitting manufacturers' Engineering Guides should be used.

Sizing Pipes & Registers

A—Square inches warm air pipe each room = cfm × .30.

B—Sizing branch runs and registers.

C—Sizing Duct Work

1. Start sizing from the branch connections farthest away from furnace.
2. Where the last two branches come together, add the branch trunk width of each and deduct 3 inches from the total for the size of the main trunk leading toward the furnace.
3. At each additional branch intersection add the main trunk width to the branch trunk width and deduct 2 inches from this total width for the size of the main trunk continuing toward the furnace. (See Fig. 6).

D—Cold Airs

Size same as warm air. Do not return air from kitchen or bathroom. Enlarge cold air returns from other rooms to equal that not returned or, where possible, bring in outside cold air to replace that not vented from kitchen and bathroom. Air from bath and kitchen may be vented to basement to supply air to furnace for combustion.

It was determined that a velocity of about 500 feet per minute through risers is satisfactory. The factor for such a velocity is .30. This is adapted from the standard Mechanical Code.

TABLE A

Square Inches W. A. Pipe	*Size Stack*	*Size Round Pipe*	*Branch Trunk Size*	*Size Reg. High Sidewall*	*Baseboard or Low Sidewall*
0-30	3¼x10	7″	4x8	5x10	6x10
30-40	3¼x12	7″	5x8	5x12	6x12
40-50	3¼x14	8″	6x8	5x14	6x14

Note:

If any run is exceptionally long or has more than three 90 degree stack elbows, or other fittings having large resistance to flow of air, enlarge such runs to the next size to allow for drop in pressure.

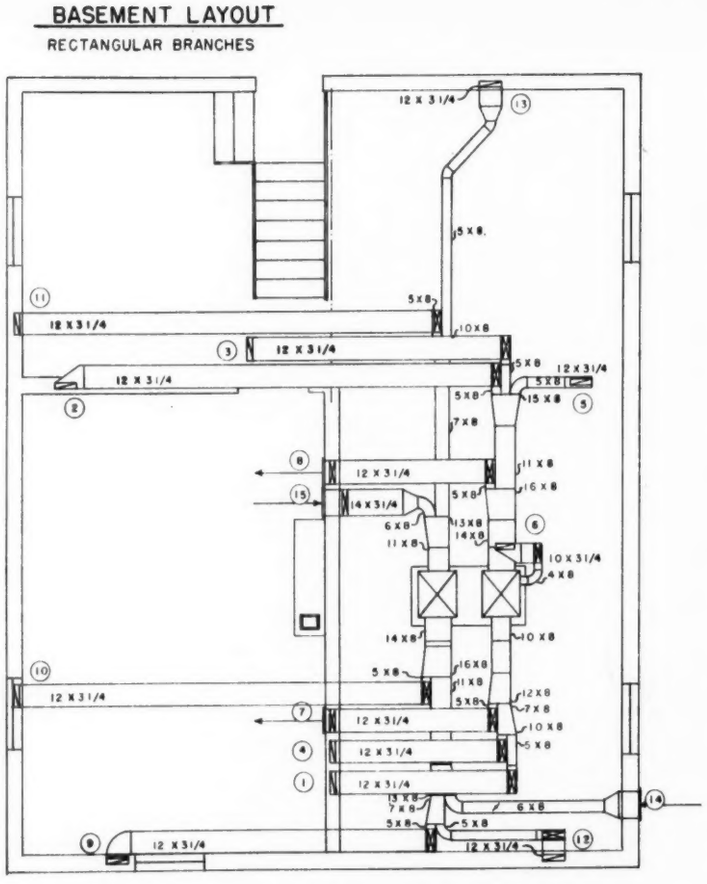


Fig. 4—All-rectangular pipe system sized according to short method and reduced as shown in Fig. 6. Text explains simplification obtained by using a few pipe sizes.

Sizing the risers then becomes simple. Multiply the cfm required in the individual room by .30 and you arrive at the square inches of pipe area necessary to carry the required air (at a velocity of about 500 fpm).

Use Few Register and Fitting Sizes

The idea of a dealer carrying dozens of sizes of registers and fittings is preposterous. It is not economical from either the viewpoint of the dealer or his customer. It means slow turnover, obsolete merchandise, high overhead and low profits.

Continuing this belief we have standardized our system with a total of six sizes of registers, three sizes of rectangular branch sizes, one (or) two

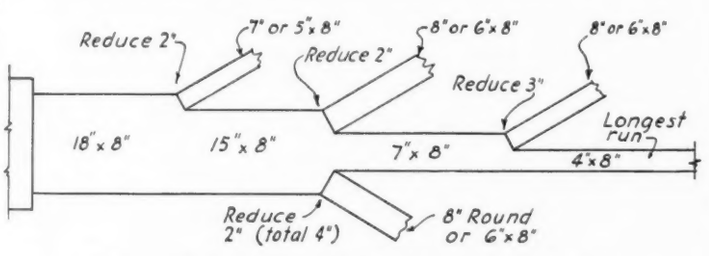


Fig. 6—Illustrating method of reducing main width as round or rectangular branches are added. This is supplemented by the use of a few standard takeoffs.

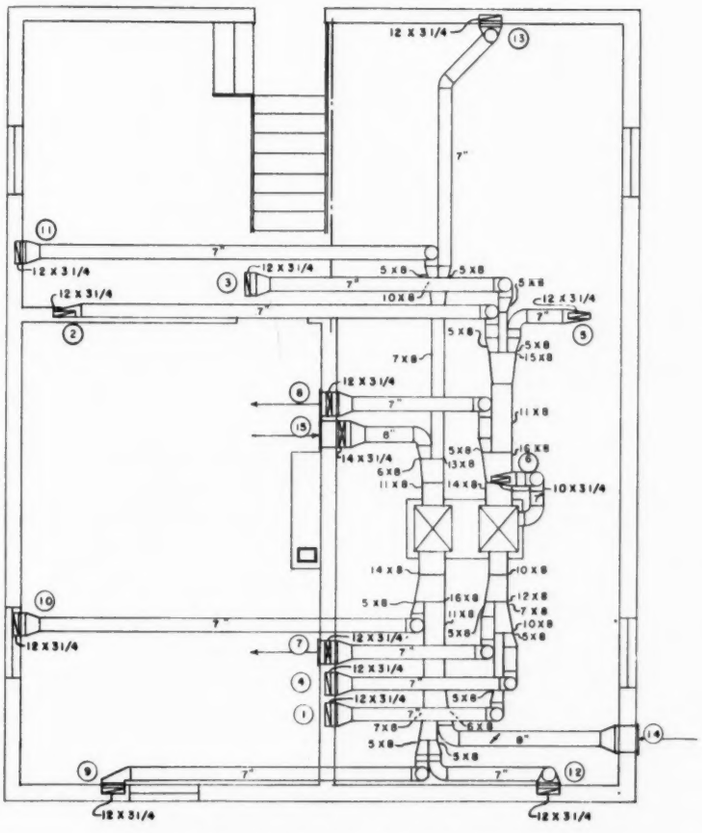


Fig. 3—Round pipe branch duct system. Note no round pipe less than 7 inches. Experience indicates that 5- and 6-inch branches do not supply a full 3¼ by 8 or 3¼ by 10 riser volume.

sizes of round pipe branches. Note the sizing table (Table A).

Ours is the experience of hundreds of dealers with whom we have worked in more or less a consulting position. The jobs that work are forgotten; the jobs that do not work are the ones we are called in on, and the more we see, the more we know about what does *not* work. One example is 5-inch and 6-inch round pipe branch lines to 3¼x8 or 3¼x10 risers.

Jobs may be installed with 3¼x8 risers that work perfectly; however, they are so much in the minority that we cannot recommend them. The runs must be short and direct to work. Long runs have too great a temperature drop to be satisfactory. The area of exposed pipe compared to the capacity of the pipe is too great. Especially is this true since these small runs are generally to bathrooms where higher register temperatures are required to maintain comfort.

Then, too, 6-inch round pipe is NOT 6 inches round. Remember that one end has a bead varying up to ¼ inch deep and that this end may be crimped down even more. Actually a 6-inch pipe is nearer 5-inch than 6-inch. It is impossible to figure more than 20 square inches of free area which suffers in comparison even with 3¼x8 rectangular, which has an area of 26 square inches. Imagine, if you will, running a pipe with an area of 20 square inches to a 3¼x10 riser having an area of 32 square inches. The idea of squeezing the air down from a large pipe to a smaller pipe just does not work.

We recommend 7-inch round equivalent size basement duct for both 3¼x10 and 3¼x12 risers. The small additional cost is overbalanced by the fact that only one size must be carried in stock, instead of two, and we can forget about trouble. We will recommend 6-inch pipes to 3¼x8 risers only for short runs requiring very little air delivery.

Register Sizes Reduced

Registers have always been a nuisance. To us and our customers it has seemed that the manufacturers have delighted in seeing how many sizes can be manufactured; especially is this true of registers located in the low sidewall or baseboard. We know that a velocity of around 300 fpm is desirable. Therefore, as we have standardized on a stack velocity of 500 fpm, we have determined that 6-inch high registers will produce the desired results.

If it so happens that too much air is delivered, it means that the room is small and 200 fpm would work just as well anyway, and the air volume may be cut down without affecting the circulation of air. Now that nearly all directional flow registers are adjustable, the same result may be secured by deflecting the air slightly downward, or sideways. This in turn would increase the resistance of the particular run and cut down the air delivery, but would have little effect on the overall air velocity through the register face.

High Registers Require Care

High sidewall registers require more care; however 5-inch high registers have worked and worked well. At a riser velocity of 500 fpm the average directional flow register will provide an air throw of 15 to 18 feet. If the room is wider than this, two or more registers will probably be required and the air throw can be taken care of by the proper location of the registers.

Complicated designs which are costly in operation as well as original cost are useless. Standardization is the secret of profits in this day of increasing competition.

Sizing the duct work is accomplished similarly to the system set forth by the mechanical code. However, again the system is standardized to 8-inch deep pipes and three sizes of reducing takeoffs.

It must be kept in mind that, like gravity jobs, long runs are the tough ones. We say that an

(*Continued on page* 104)

Pattern Development for

Air Conditioning Fittings *

By William Neubecker
Head Instructor
Sheet Metal Department, New York Trade School

A Boot-Round to Rectangular

FIG. 52 shows a perspective view of a boot round to rectangular. The riser connection is 4x12 inches or 48 square inches area. If the round duct connection is to have an equal area, the diameter of the round end is computed by using the following formula:

$\sqrt{48 \div .7854} = 7.81$ or say 8 inches, in practice.

The calculation is as follow: divide 48 by .7854 and obtain 61.

```
.7854 | 48.0000 | 61
      |--------|
      | 47.124x|
      |--------|
      |  8760  |
      |  7854  |
      |--------|
```

Now extract the square root of 61 as follows:

```
140                61 | 7.81
  8                49
---               ---
148               1200
  8               1184
---               ---
1184                16 00
==                15 61
1560               ----
   1
---
1561
==
```

Here is how to work square root. Find the nearest number, when squared, that will be nearest to 61, but not over 61.

$8 \times 8 = 64$ and is too great a number.

Then take 7: $7 \times 7 = 49$. Deduct 49 from 61 leaves 12; add two ciphers to 12 or 1200. Double 7 and add a cipher or 140. Again find the nearest number, which, added to 140 and used as a multiplier will be nearest to 1200 but not over, in this case 8; add 8 to 140 or 148; $8 \times 148 = 1184$ which is deducted from 1200 and leaves 16 to which add two ciphers or 1600. Double 78 and obtain 156 to which add a cipher or 1560 which goes in 1600 once; add 1 to 1560 or 1561. 7.8 is then the square root of 61.

This can be proven by multiplying $7.81 \times 7.81 = 60.99$.

In practical work the diameter of the round end would be made 8 inches. It may not be out of place to say if a decimal was attached, say 61.25 the same procedure would be followed, always spacing off two figures to the *left* as shown here by 61 - 25.

The patterns for this boot shown in Fig. 52 will require triangulation and parallel line developments in its solution as will follow:

Developing the Pattern Shapes

Knowing the dimensions required, draw the side elevation in Fig. 53 as shown by *A-B-C-D-E-F*. Make *F-A* four inches and *C-D* eight inches. Above *F-A* draw the rectangular section *G* 4x12 inches as shown. To the right of *C-D* draw the front elevation projected from the side as shown by the dotted lines and similar letters. Use *a* as the center for striking the 8 inch circle.

In practice it is only necessary to draw one half of the front elevation because both halves are symmetrical.. Now divide one half of the circle *H* in front elevation into equal divisions as shown from *1* to *7*, being careful to use more divisions in practical work. From points *1* to *4* draw lines to the corner B^o and from points *4* to *7* draw lines to the corner E^o, both corners B^o and E^o were projected from *B* and *E* in side elevation.

If desired the points *1* to *7* in front elevation can be projected to the line *C-D* in side elevation and lines drawn to corresponding corners *B* and *E*. These lines have been drawn to show the relation to similar lines in front elevation but can be omitted in practical work. To obtain the true lengths of the lines shown in front elevation the following procedure is employed.

Parallel to the line *C-D* in side elevation from the corners *C-B* and *E* draw lines indefinitely as

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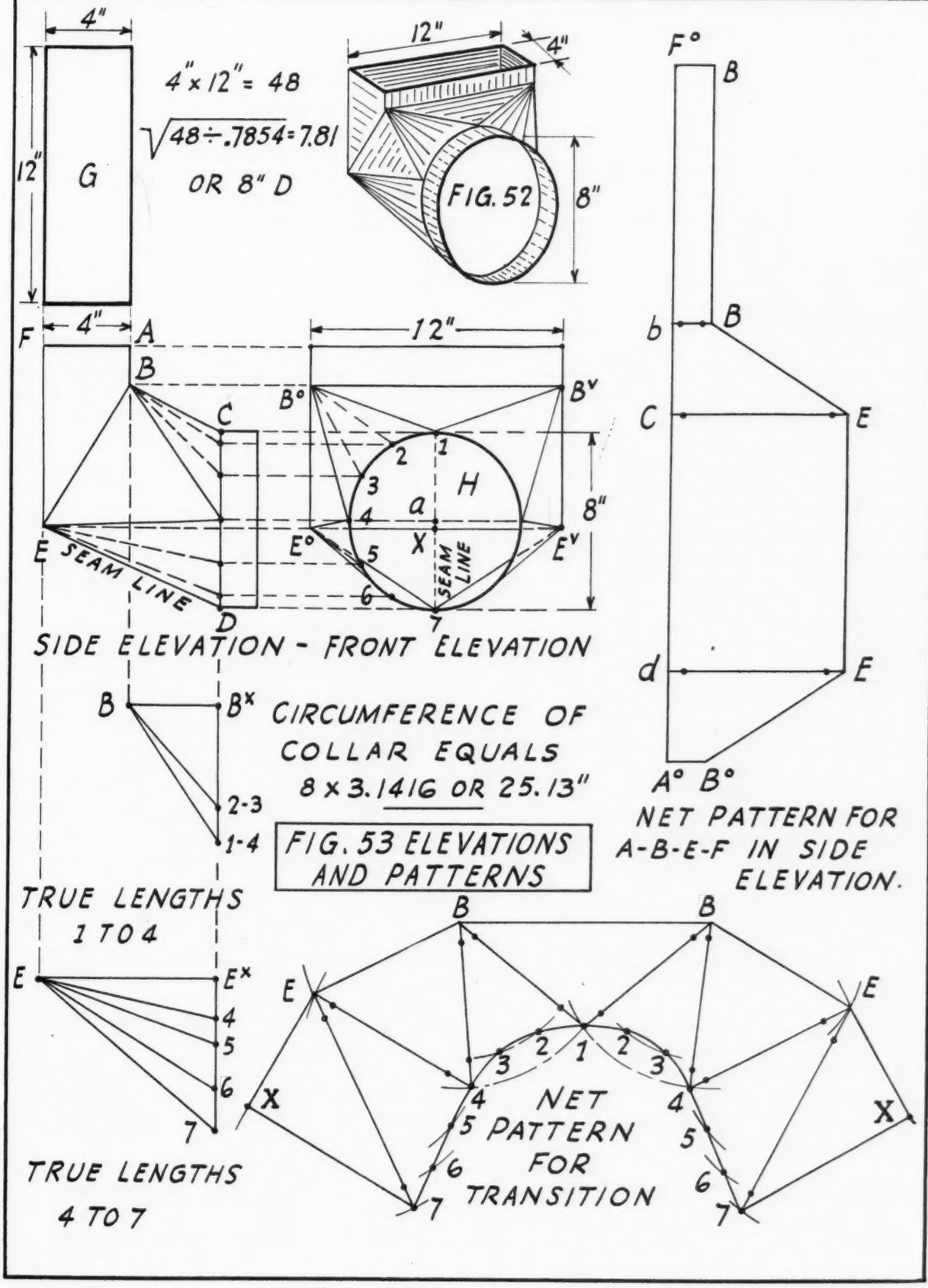
PATTERN FOR BOOT ROUND TO RECTANGULAR



shown respectively by *C-7*, *B-B* and *E-E*. Now take the distances B^{o}-*1*, *2*, *3* and *4* in front elevation and set them off from any point as B^{x} on the line *C-7* in the true lengths as shown respectively by B^{x}-*1*, *2*, *3* and *4*. From B^{x} draw the line B^{x}-*B* at right angles to B^{x}-*1* to intersect the line drawn from *B* inside elevation, at B in the true lengths.

Draw lines from *1-2-3* and *4* in the true lengths, to *B*, which will be the true lengths of similar numbered lines in the front elevation. In a similar manner measuring from any point as E^{x} on the line *C-7*, draw the line E^{x}-*E* at right angles to *C-7* to intersect the line drawn from *E* in side elevation at *E* in the true lengths.

Now take the various distances in front elevation from E^{o} to *4-5-6* and *7* and set them off from E^{x} in the true lengths as shown by *4-5-6* and *7*, from which points draw lines to *E*, which will be the true lengths of similar numbered lines in the front elevation. Having found all the true lengths the pattern for the transition is now in order.

Take the distance of B^{o}-B^{v} in front elevation or 12 inches and place it as shown by *B-B* in the pattern below. With *B-1* in the true lengths as radius, and *B* and *B* in the pattern as center intersect arcs at *1*. Draw lines from *B* to *1* on both sides. Now with radii equal to *B-2*, *3* and *4* in the true lengths and *B* in the pattern as center draw the short arcs near *2*, *3* and *4*. Set the dividers equal to the divisions between *1* and *4* in the front elevation and starting from *1* in the pattern, step to arcs *2*, *3* and *4* and draw a line from *4* to *B* on both sides of the pattern.

Now with *B-E* in the side elevation as radius and *B* in the pattern as center, draw short arcs near *E* and intersect them by arcs struck from *4* as center, with *4-E* in the true lengths as radius. Draw lines from *B* to *E* to *4* on both sides of the pattern. With radii equal to *E-5*, *6* and *7* in the true lengths and *E* in the pattern as center, draw short arcs near *5*, *6* and *7*. Set the dividers equal to the divisions between *4* and *7* in front elevation and starting from *4* in the pattern, step to arcs *5*, *6* and *7*, and draw a line from *7* to *E* on both sides.

Now with E^{o}-*X* in front elevation, or 6 inches, as radius and *E* in pattern as center, draw short arcs near *X*, which intersect by an arc, struck from *7* in pattern as center with *D-E* in side elevation as radius. Draw lines in pattern from *E* to *X* to *7* on both sides. Through the various intersections *7* to *1* to *7* trace the curved line as shown. Then will *X-E-B-B-E-X-7-1-7-X* be the net pattern for the transition piece shown by *B-C-D-E* in side elevation.

The pattern for the riser connection *B-A-F-E* in side elevation is laid out as follows: Take the girth of the rectangle *G*, above the side elevation and set it off on the line A^{o}-F^{o} at the right. At right angles to this line from F^{o}-*b-c-d*-A^{o} draw lines indefinitely. Now take the distance from *A* to *B* in side elevation, and set it off in the riser pattern on horizontal lines drawn from F^{o}, *b* and A^{o} and obtain points *B*, *B* and B^{o}.

In a similar manner, take the distance *F* to *E* in side elevation and set it off in the rectangle pattern on lines drawn from *c* and *d* and obtain points *E* and *E*. Connect all points by lines drawn from *B* to *B* to *E* to *E* to B^{o} which will be the net pattern for the rectangular connection shown by *B-A-F-E* in side elevation.

Allow laps on all patterns for seaming.

The circumference of the round collar which is seamed along *C-D* in side elevation is found by multiplying the diameter or 8 inches by 3.1416 or $8 \times 3.1416 = 25.13$ or $25\frac{1}{8}$ inches without lap. In this problem the narrow side of the rectangle or 4 inches is shown at the side while the 12-inch length shows in front. If the conditions were reversed and the 12-inch length was at the side and the 4 inches at the front, the same principles would be used in developing the pattern shapes, as described above.

Air Conditioning A Bullion Cube Plant

(*Continued from page* 45)

This apparatus is a duplicate of the two units in the packaging room except as to capacity. Its refrigeration tonnage rating is 3 tons and its air volume 1250 cu. ft. per minute. In winter the heating coils in the unit provide adequate heating and air purification by filter. A wall thermostat automatically turns on the refrigeration during hot weather. During intermediate weather when neither heat nor refrigeration is needed, both units are idle.

The thermostat is of modulating type and of double contact to allow summer cooling from May 1 to October 1 or heating in the winter. In cooling air temperature at the unit ranges from 68 to 70 deg. Fahr., while the unit maintains 80 deg. Fahr. and 50 per cent R.H. inside when exterior weather is 95 deg. dry bulb and 75 deg. wet bulb.

In discussing this project and reasons for selecting units rather than a central system, the engineer based his selection on the greater simplicity of units, greater choice in capacities—for one has only to compute heat loss and select unit size—space saving, plus other advantages.

The Installation and Use of Attic Fans
[Part 4]

The Engineering Experiment Station of the Agricultural and Mechanical College of Texas has conducted considerable research on attic and window fans—their costs, results, practicability. This research has covered both laboratory and field installations. From the data gathered the college has published Bulletin 52. Part 1 of this series appeared in the April issue; Part 2 in May; Part 3 in June; this article concludes the series.

THE quietness of an attic fan installation will depend to a great extent upon the inherent characteristics of the fan, but care in its proper installation will go far in providing quiet operation and consequently a more satisfactory fan installation. Regardless of how well balanced a fan is, and in addition to any vibration dampeners built into the fan itself, it should be insulated from the attic floor by being mounted on vibration dampeners, sponge rubber, or felt cushions. The fan motor should be mounted so that vibration and sound transmission are eliminated.

For most satisfactory results, the fan should be located over a partition wall or as near one as possible. Sometimes it will be necessary to provide additional bracing between ceiling joists, and this should be in the form of bridging placed at right angles to the joists and from the bottom of one joist diagonally to the top of the next. If the fan must be placed at any distance from a partition wall, it may be necessary to add vertical braces from the ceiling joists to the roof rafters to prevent possible sagging of the ceiling and help reduce vibration to a minimum. The ceiling joists should be floored beneath the fan and the suction box and for four or five feet in front of the fan discharge.

The fan housing should be isolated from the suction box by means of a strip of eight or ten ounce canvas eight to ten inches wide (See Fig. 3) so that vibrations or noises will not be transmitted directly to the box and subsequently to the house structure.

If a support is needed to hold the fan in an upright position, use a metal strap attaching one end to the suction chamber and the other end to a vibration dampener on the fan.

Caution should be exercised in wiring the fan to provide flexible or non-metallic connections to the motor to prevent sound transmission.

Most attic fans operating under pressure or resistance become noisy. Resistance is determined largely by the size of the intake opening to the suction box and the exhaust opening from the attic, and therefore, for quiet operation, it is essential that grille and attic discharge openings of not less than the recommended size in Table IV (May issue) be used. As mentioned, the fan should never be placed closer than one fan diameter to the nearest edge of the ceiling grille, and the fan discharge should never blow directly against any obstruction such as a chimney, gable wall, or roof. If, because of the nature of the attic, it is impossible to locate the fan so that it will not discharge directly against such an obstruction, the fan should be placed at least five feet from it. Quietest results are secured with the suction box constructed of rigid fiber board having sound absorptive qualities. If, in order to install a fan, it is impossible to locate it five feet or more from an obstruction, spreaders or diffusers as illustrated in the May issue may be employed to some advantage.

6. Wiring Recommendations

The services of licensed electricians should be used in every installation where they are avail-

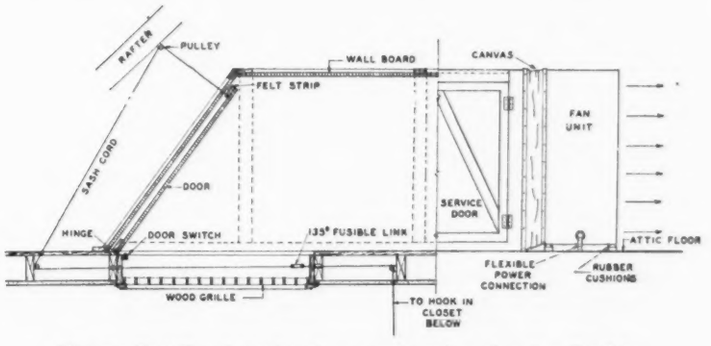


Fig. 3—Details of suction box construction showing flexible canvas connection between fan and box, trap door with fusible link to close in case of fire and framing which eliminates vibration.

able. All wiring ordinances and fire underwriters regulations should be complied with. The fan motor should be connected to a circuit of adequate size to carry the increased load. If an existing circuit is not available, the motor should be placed on a separate circuit of not less than No. 12 wire. Fans with one-half horsepower and larger motors should invariably be placed on separate circuits of No. 12 wire or larger.

The switch should be located as centrally and conveniently as possible. In a two-story house, and occasionally in other instances, it is desirable that two three-way switches be used so that the fan may be controlled from either floor. Some fan owners prefer that the switch be placed near the owner's bed. However, usually the most convenient location is a centrally located hall. In order to avoid confusion with light switches, the fan switches should be placed at least twelve to eighteen inches above the customary height employed for light switches. Automatic time switches can be obtained at slight additional cost. This type of switch can be set so that when the fan is turned on, it will operate any desired number of hours, and when this time has elapsed, it will turn the fan off; or when the fan is not running, the time switch may be set to turn the fan on in a predetermined length of time. A time switch or a thermostatic switch is particularly desirable where the night temperature drops so low before morning that it becomes uncomfortably cool. After a few trials, the correct setting of the time switch may be determined so that the fan will be turned off at approximately the desired time after retiring and before it becomes too cool for comfort.

7. Safety Devices

Some local and some state fire codes require that a fusible link with a 135° to 150° F melting point be inserted in the pull cord which operate the ceiling grille trap door. The fan should be equipped with an automatic shut-off switch that stops the motor when the trap door is lowered. (See May issue.) Every fan motor should be equipped with an internal automatic thermal overload protective device. If for any reason the motor should become overloaded this device will stop the motor automatically before it becomes dangerously hot, and will automatically start the motor again after it has cooled to a safe operating temperature. If the motor should cut off and on repeatedly at short intervals, this indicates that it is overheated and an inspection should be made at once to determine its cause. Belt tension and the lubrication of the motor and the fan should be checked. Should the automatic stopping still persist, call an electrician or the dealer who made the installation.

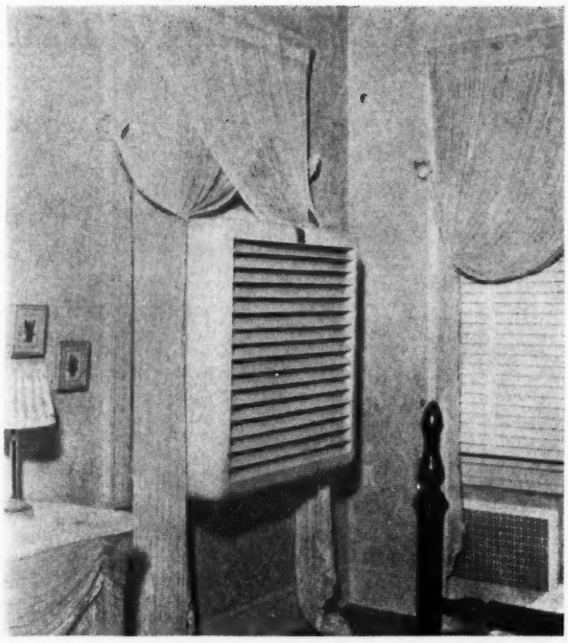


Fig. 39—Typical window fan in housing with adjustable inside louvres and means for placing housing in lower sash opening. (Photo from Shreveport Engineering Co.)

◆

V. Window Ventilating Fans

Window fan ventilation is particularly adaptable to the following types of situations: the apartment without access to an attic, the rented house on short lease where the landlord will not put in an attic unit, houses without sufficient attic space in which to install an attic fan, houses for which the owner cannot afford the price of an attic fan but needs relief badly, offices and other interiors. This type of ventilation (illustrated in Figs. 39 and 40) is similar to attic ventilation except that the fan is mounted in a window instead of the attic and exhausts the air from the room directly to the outside.

The window box fan unit consists of a fan and a motor mounted in a frame and protected by a sturdy grille, and is completely assembled requiring no suction box. Such a fan is easily and quickly installed in any double sash window and requires no special wiring, for it may be plugged into any convenient electrical outlet. The operation is the same as that required for an attic installation. When a window fan is operated in the reversed direction discharging air into the room from the outdoors instead of exhausting it from the room, the fan should not be installed where air will be pulled in from the hot pavement of streets and sidewalks or from over a hot roof.

VII. Installation and Operation Suggestions

1. Be sure that the motor has sufficient oil before it is put into operation; about two teaspoons of light (SAE 10) motor oil as used in automobiles will be sufficient, but do not fill the oil cups

until they overflow. If the motor has wool yarn in the bearing oil cups, oil should be added slowly so that it may be absorbed by the yarn. If the motor or fan has ball bearings, use white petroleum jelly (Vaseline) for lubrication. Do not attempt to lubricate either the fan or the motor while in motion.

2. See that the fan rotates freely by hand before it is first turned on. Check the completed installation with a wattmeter or ammeter to see that the motor is not overloaded.

3. Check the voltage on the motor name plate and be sure that the line voltage is correct. Always check electrical connections by the diagram furnished with the motor and follow closely instructions on motor instruction card.

4. Examine the motor starting mechanism. Sometimes the starting mechanism on even a new motor will stick, and a simple adjustment will make it as good as new.

5. Check the adjustment and alignment of the belt. A belt should not be slack enough to feel "dead." A belt which is too loose will make a squealing noise when starting, but V-belts should never be taut. Never set belts so tight that they will bind the motor for this will overload the motor and cause undue wear on the bearings. For proper adjustment, it should be possible to deflect the belt between the pulleys about an inch up or down by medium pressure of the thumb. New belts should be checked after the first three or four weeks of service.

The fan pulley and the motor pulley should be parallel to each other and the axes of their belt grooves on the same straight line. This is important to insure smooth operation as well as long life of the belt and the motor bearings.

6. Be sure that all electrical connections are tight, for loose connections will cause low voltage at motor terminals and possibly create a fire hazard.

Fig. 40—Type of window fan somewhat simpler than Fig. 39. (Photo from Shreveport Engineering Co.)

7. Tighten the bolts holding motor to bracket and bracket to fan; tighten the set-screws holding fan shaft in hub; properly align motor and fan pulleys, and tighten set-screws on each.

8. If the motor gets too hot and the speed seems to slow down, check the line to the motor and the voltage at the motor. Low voltage may be caused by a line that is too long or a wire that is too small. Check the load on the fan, and be sure that the ceiling grille opening and the exhaust openings are open. If an automatic ceiling grille, shutter, or doors are used, see that they open freely. Clean and oil hinge pins on automatic openings.

9. Never start the fan without first seeing that a window or door is open.

10. Be sure that no rigid connection is made to the fan housing.

11. Do not accept a motor without automatic thermal overload protection.

12. Never place the fan so that air will blow against any obstruction such as chimney, roof, or wall. Clearance on the exhaust side of the fan should never be less than five feet.

13. Employ adequate fan capacity—purchase only fans with certified ratings. Insist upon adequate ceiling grille and louver area.

14. Do not fail to provide a door over the ceiling grille and the exhaust openings which may be closed in winter.

15. Regardless of how well balanced a fan is constructed, it should be installed on vibration dampeners and a canvas connection made to the suction box.

16. If possible, locate the fan over a partition wall, and avoid placing it closer than one fan diameter to the nearest side of the ceiling grille.

17. Do not expect too much from attic ventilation, for after all *it isn't complete air conditioning* and you can't "get something for nothing."

18. At the beginning of each season before the fan is put in operation the following items should be checked:

(a) Turn the fan over by hand and lubricate the bearings and motor as indicated in (1) above.

(b) All moving parts should be cleaned, and their operation checked.

(c) Tighten all bolts, nuts, set-screws, etc., which may have worked loose; particularly check and tighten fan and pulley set-screws.

(d) See that ceiling grille and exhaust door are again opened.

(e) Wipe off fan wheel and shutter blades or ceiling grille. If automatic louvers are used, wipe off pins that hold blades and apply a drop of light oil. Clean riding surfaces of belt, and apply a little castor oil.

The Degree Day Method of Estimating Fuel Costs*

By Eugene O. Olson
Engineering Extension Service, Iowa State College

THE city officials of "Prairie Valley" are planning to build a library. They have the plans and are asking for bids on the heating system. Upon calculating the heat loss you find it to be 200,000 B.t.u. per hour, based on —10° outside and 70° inside.

In addition to asking for a bid on the heating plant, they want an estimate of the probable yearly cost for fuel. It is this estimate that we are concerned with now. "Prairie Valley" is in Central Iowa.

It is customary among some heating men to estimate fuel cost at 20c to 25c per square foot of steam radiation. However, in order to cover all kinds of heating systems and all kinds of fuel we must use a more fundamental basis for calculation.

This is possible by using the unit known as the degree-day as the basic unit of weather measurement, and the heat loss of the building in B.t.u. as governing the heat requirements. Degree-days should be defined and understood.

Definition of the Degree Day

To a beginner, the term degree-days is probably confusing, and it is no disgrace if a seasoned heating man sometimes does not fully understand its application. However, a correct conception of degree-days is not so difficult.

Briefly, a degree-day is one degree of heating weather during one day. The base temperature commonly used with buildings heated to 70° or 72° is 65°. Therefore a degree-day may be defined as the product of one day times a difference of one degree between the mean temperature for that day and 65°.

For example, if the maximum for the day is 70° and the minimum is 58° the mean temperature is 64°, or 1° below 65°. For that day we would have one degree-day.

(The mean temperature $= \frac{\text{max.} + \text{min.}}{2}$.)

If the high were 70° and the low 40°, the mean would be 55°, or 10° below 65°. There would then be 10° × 1 day or 10 degree-days of heating on that day.

(Degree days = 65°—mean temp. for the day.)

Sixty-five degrees has been established as the base temperature because field observations indicate that in average installations heat will be required inside when outside temperature drops below that point. Different bases are of course necessary where inside temperatures much higher or lower than 70° are maintained.

Night thermostat set-backs and conditions of occupancy will have some effect upon base temperature, but for all practical purposes the use of 65° will not introduce any serious error. Field tests indicate that under the most extreme conditions of occupancy the error is only about 2°. For ordinary occupancy the base of 65° is practical, and will be used throughout this discussion.

Having established the method of calculating degree-days, it is a simple matter to keep a record of accumulated degree-days from the beginning of the heating season. The U. S. Weather Bureau stations give daily mean temperatures and monthly accumulated degree-day totals. The nearest Weather Bureau station reports are adequate for practical use.

Now back to our problem: We find that the nearest weather station to Prairie Valley is Des Moines, with a normal degree-day total (average of many years) of 6,400 for the heating season. Sioux City shows about 6,700. Let us say Prairie Valley has 6,500.

The calculated heat loss from the building of 200,000 B.t.u. is based upon a temperature difference of 80°. Therefore the heat loss per 1° temperature difference per hour is $\frac{200{,}000}{80}$ B.t.u.

The heat loss per 1° difference per day, or per degree-day is $\frac{(200{,}000)\ (24)}{80}$ B.t.u.

Hence, the heat loss per normal heating season is $\frac{(200{,}000)\ (24)\ (6500)}{80}$ B.t.u. That represents the heat that must be supplied to the building.

If the overall efficiency of the heating plant is

(*Continued on page* 107)

*Paper delivered at the Sixth Annual Iowa Heating and Air Conditioning Conference.

Residential Warm Air Heating

For Architects and Builders (Part 1)

By Carl H. Dean
Oklahoma Natural Gas Company

This is the first of two articles edited from an address by the author to builders. This article stresses the value of good heating practice; Part 2 tells what constitutes good design and engineering. In these two articles are numerous excellent sales points for the contractor trying to get the architect or builder to increase the money allotted to heating.

As a heating engineer, the problem of proper residential heating most likely assumes undue importance in my mind. But I claim that the health and comfort and consequently the happiness of the occupants of a home in this territory for six months each year depends in a measure upon the heating system. Therefore it is important.

Because our more severe cold weather in this area comes in spells of short duration and our extreme summer temperatures last for such long periods it has been the general practice to pay more attention to items concerning summer comfort, consequently heating has been neglected. We have rigid plumbing codes, our wiring code is so strict as to call forth the charge of racketeering but when it comes to heating let your conscience, if any, be your guide. For the past six years part of my duty has been to investigate high gas bill complaints in residences with central heating systems and I want to tell you gentlemen that there are actually hundreds of furnaces installed in the City of Tulsa that the people who sold and installed them and the builders whether contractors or architects that permitted such installations should, in my opinion, be in the penitentiary. Many cases may be the result of ignorance but ignorance is surely no excuse when a fee is being charged for knowledge.

Selecting Fuel and Equipment

The type of heating equipment used in any territory is governed by many factors. In our great southwest we have vast reservoirs of natural gas and especially in Oklahoma we have the combination of a moderate winter and a low rate for the gas. So when you build a house for market you do not have to choose between stoker fired coal furnaces, oil burners or gas. The public has already chosen gas. You must determine the type of equipment.

Central Heating Preferred If Price Permits

By all means use a central heating system if the budget can be stretched to handle it. Even if it means sacrificing that wisteria closet bowl. I know that sounds sacriligious but too many houses have been sold by a wood burning fireplace, a pea green bath tub or some red linoleum on the kitchen drainboard, and the punk heating system made an enemy for the building fraternity forever.

The highly publicized floor furnace is not a true central heating system. True it is the best substitute available for houses without basements and owners with very limited means. Prior to the advent of the floor furnace the moderate priced house in this territory was built without a basement and piped for gas with an outlet in each room. The owner was forced to use open flame heaters as there was only one flue in the house and it was placed in the kitchen. The walls sweat and ruined the decorating and the windows were dripping all winter long. The window sills were rotting out, the doors swelled and wouldn't close and the vapor passing through the walls to the outside loosened the paint.

Limitations of Circulating Heaters

Then came the full vented circulating heater. It was placed in the dining room for ready access to the kitchen flue and furnished dry heat. But the heat was gravity heat and was delivered four feet above the floor and it was necessary to overheat the dining room in order to heat the rest of the house. The heater was bulky and took up valuable furniture space. For this type of house the floor furnace seems like the answer to prayer, but it is definitely a backward step to use floor furnaces in the class of residence that formerly had a central heating system.

I now find homes offered for seven or eight

thousand dollars, depending on one or two floor furnaces for heat. I have even found homes in the twelve to twenty thousand dollar class that have been foreclosed where the realtors, acting as agents for the insurance companies, installed floor furnaces rather than modernize the heating equipment. The dry heat from floor furnaces brings up another item. Namely, houses sweating when heated by floor furnaces when one of the most highly advertised features of floor furnace heat is that it stops sweating.

What Causes "Sweating"

Last winter we found hundreds of new houses sweating with floor furnace heat. We have been preaching proper venting of gas heating appliances for years. There may be some of you here who do not know why houses sweat with gas heat. It is because you abuse gas as you would not dare abuse another fuel. Any fuel requires oxygen to sustain combustion. Our 1,050 B.t.u. natural gas requires approximately 10 cubic feet of air for the combustion of one cubic foot of gas. The oxygen in the air combines with the hydrogen in the gas and the principal product of a combustion is water vapor. The amount varies, but roughly you can figure one quart of water vapor for every cent of your gas bill.

If this vapor is not carried out the flue it is released into the air in your house. When the moist air in the house comes in contact with surfaces at a temperature below the dew point of the air, condensation takes place and we say the house sweats. But the floor furnaces were connected to a flue you say. Oh yeah! What a connection and what a flue.

Proper Chimneys or Vents Essential

You built a charming Cape Cod bungalow with a marvelous wood burning fireplace at the extreme end of the living room. And you didn't put a damper in the fireplace either and when one prospective owner asked you about that you readily answered that you built them that way so you could give a written guarantee that the fireplace would not smoke. You installed a floor furnace in the archway between the living room and dining room and another one in the hall connecting the bedrooms and bath. Both were 35,000 B.t.u. input with 4-inch diameter flue collars. The house was so arranged that a 6-inch diameter Transite flue could have been installed near the center of the house not further than 10 feet from either furnace. But no, you set a piece of sewer tile in the chimney of the fireplace and after several crooks and bends arrived at an opening under the floor six inches below the joists. Gentlemen! I am not exaggerating. Then you installed or permitted to be installed, a 4-inch diameter 28-gauge galvanized iron down spout running from the hall furnace to the living room fireplace flue, a distance of 30 feet, and the damn thing actually had to run downhill to the opening you had left. Then to gild the lily you connected the other furnace into this same pipe with a tee and since 4 plus 4 equal 4 you never increased the size of the fume pipe after the junction.

It wouldn't have helped much if you had increased the size of the fume pipe and had arranged for a slight rise in the pipe possible for the distance. The house would sweat anyway. The victim called you and told you the house was sweating and you said "Of course it is. All well built houses sweat for the first year." All modern floor furnaces that bear the seal of the American Gas Association are too efficient to permit loss of heat sufficient to heat an outside flue enough to create a draft. The products of combustion that did reach the flue condensed on the sides, seeped through the mortar and the alternate freezing and thawing will, I am sure, prolong the life of the beautiful stone chimney. But the most of the water vapor escaped through the draft diverter under the house where it set up a partial vapor pressure forcing the vapor through the floors and the house sweats. There is fungus growth 3 inches long under that house.

Floor Furnace Location

If it is necessary to use floor furnaces, give the problem some thought. Exposure of the house is a determining factor in locating the furnace. A house facing south is the hardest to heat due to north wind pressure during the most severe weather. A floor furnace placed in a hallway will not heat a room located north of it unless a grill is placed above the door leading to that room. A floor furnace located between the living room and dining room in a house facing south will not prevent sweating in a breakfast room north of the kitchen adjoining the dining room. Insulation of ceilings always helps the effect of a floor furnace in a room connected to the one where the furnace is located. Always connect furnace to an inside flue. Never consider floor furnaces for two story houses.

Forced Air Brings Flexibility

In the field of central heating there are many new developments resulting from the introduction of the centrifugal blower to quietly force the delivery of heated air. I am old fashioned enough to prefer a basement for location of heating equipment and thus utilize the radiated heat from equipment and ducts to warm the floors. However I do not object to forced air heating equip-

(Continued on page 114)

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Manufacture of Dish Washing Machines by Electric Arc Welding

Data and illustrations from a study submitted to the James F. Lincoln Arc Welding Foundation by T. F. Rataiczak and G. B. Fox, chief engineer and production manager of dishwasher division, The Hobart Manufacturing Co., Troy, Ohio, in a recent program. In its current $200,000 Industrial Progress Program, which closes June 1, 1942, the Foundation is offering 458 awards from $100 to $13,700, for reports of advances and improvements made by application of arc welding in design, manufacture, fabrication, construction and maintenance.

THE material presented in this paper relates to the manufacture of certain parts of commercial dish washing machines which consist of a tank for holding the washing solution, a framework to support the tank and the pump or other operating mechanism and a chamber, covering the tank, in which the washing is done.

The tank and chamber are usually made of some form of sheet metal, the most common being galvanized iron, Monel metal, or 18-8 stainless steel.

The supporting structure is built up of angles and sheets joined together by suitable means such as riveting or welding.

The customary method of fabricating the tanks and chambers has been to lap seam, rivet and solder to make water-tight. Torch welding has also been used to a considerable extent on tanks and chambers made of galvanized sheet and to a very limited extent on tanks made of Monel metal or stainless steel.

With the advance in the art of arc welding of thin sheets, investigation revealed that a worthwhile saving might be realized by using arc welding to the fullest extent in the fabrication of tanks and chambers. Some few of the smaller models were selected for study, to determine what changes might be necessary to get the greatest saving by arc welding. Numerous types of welds were made using various kinds of welding rods, and such types of welds and kinds of rods that showed up well in the tests were selected for ultimate use.

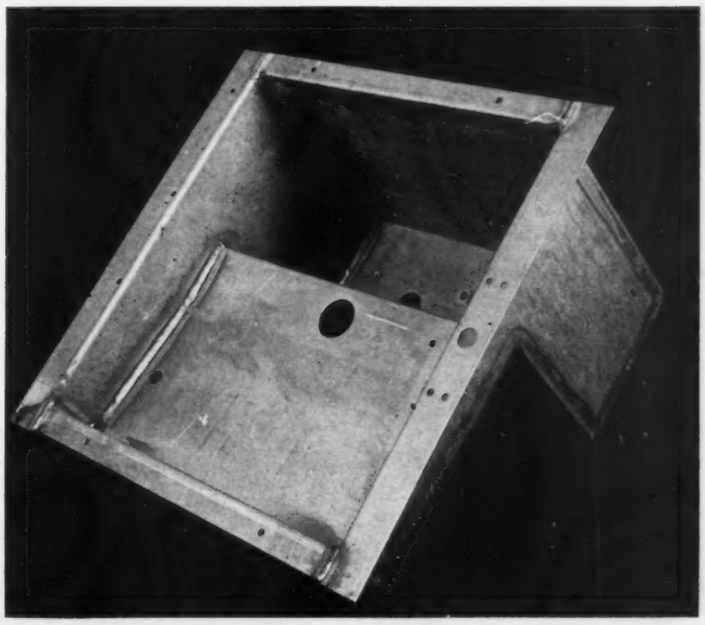


Fig. 1—Tank of a small dish washing machine fabricated by arc welding. Some redesign of sheet parts was necessary to facilitate welding.

Fig. 2—Special welding fixture used to hold tank during welding. Sheets are lapped at joints and enough heat used to obtain fusion through the lapped sheets.

First, certain machines were redesigned, changing only those parts necessary to make them adaptable to arc welding.

Second, fixtures were designed and built so that parts to be welded could be held properly and so that all parts would be interchangeable.

Third, a certain amount of practice had to be acquired by the welders before their technique was perfected to the point that suitable work was produced. Many of these welds were in places difficult to reach on account of space limitations.

One of the first jobs studied and changed over to arc welded construction was the tank of one of

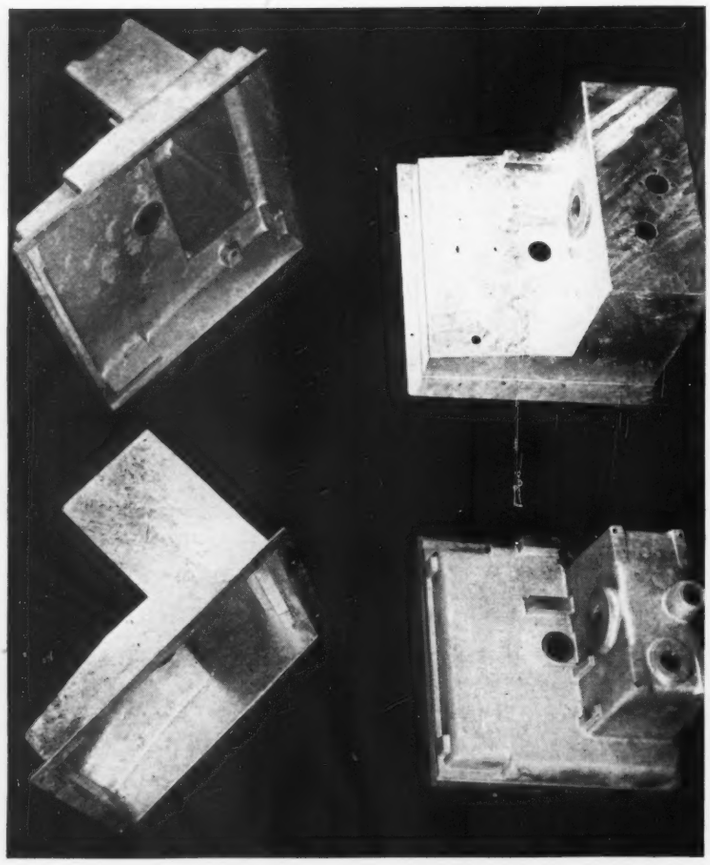


Fig. 3—In the upper right and lower left corners are completed galvanized tank of arc welded construction. In upper left and lower right corners are the galvanized cast iron tank used formerly.

Fig. 4—Wash chamber parts positioned in welding fixture. Welding is done on inside corners leaving outside clean and smooth, requiring little polishing.

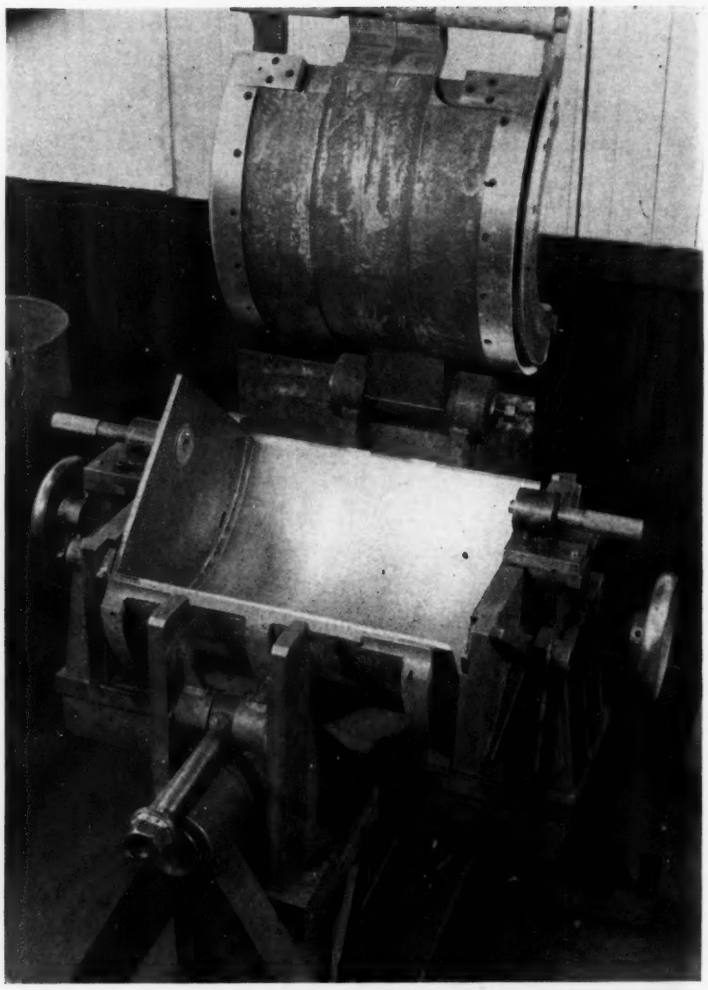


Fig. 5—Welding the wash chamber in the special fixture which permits swinging tank for easiest welding position.

the smaller dish washing machines. Fig. 1 shows this tank as arc welded.

Sheets for this tank are cut accurately to size, pierced and formed. They are then held in a welding fixture shown in Fig. 2. The sheets are cut so that they lap at the joint. In welding, enough heat is applied to cause fusion through the joint. The weld is run around on the inside of the tank. This leaves the outside of the tank smooth with the exception of a slight bead due to fusing through and minimizes the amount of weld dressing that must be done. Two lugs and one boss are then arc welded to the outside of this tank in the proper locations. Also arc welded to the back of the tank on the inside is a small angle formed of the same material as the tank.

Tanks made in this manner may be made of 18-8 stainless, Monel metal or of hot rolled steel sheet of galvanized grade.

When made of 18-8 stainless or of Monel metal the discoloration due to weld can be removed quickly and easily at small expense. When made of black rolled sheet the welded tanks are hot-dip galvanized, thus securing a tank, every surface of which is covered with a protectve coating.

Top, Fig. 6—Old construction of stainless steel tank riveted and soldered. Center, Fig. 7—New construction of stainless steel tank arc welded. Bottom, Fig. 8—Outside appearance of the arc welded, stainless steel tank, showing clean, small welding beads.

◆

Advantages of arc welded tank:

1. 44 pounds lighter in weight than cast tank. Cast iron tank—92 pounds. Fabricated tank 48 pounds.
2. Can be made to hold more water than cast tank, although of same extreme outside dimensions. Cast iron tank—3 gallons. Fabricated tank—5.5 gallons.
3. No machining after galvanizing necessary, hence no raw metal left exposed.
4. A 10% saving in the overall cost of tanks after necessary attachments are assembled.

In the upper right and lower left hand corner of Fig. 3 is shown photos of the completed galvanized tank of arc welded construction. In the upper left and lower right hand corner of Fig. 3 is shown photos of the galvanized cast iron tank which has been superseded by the arc welded tank.

The wash chamber for the tank described in the preceding paragraphs is made of 22 gauge stainless steel. It consists of two cylindrical shaped halves arranged to rock on a horzontal axis one within the other with sufficient overlap to prevent leakage.

Parts for the chambers are cut and formed. They are then held in a fixture as shown in Figs. 4 and 5 for the welding operation. The weld is run on the inside corner leaving the outside clean and smooth, requiring very little polishing.

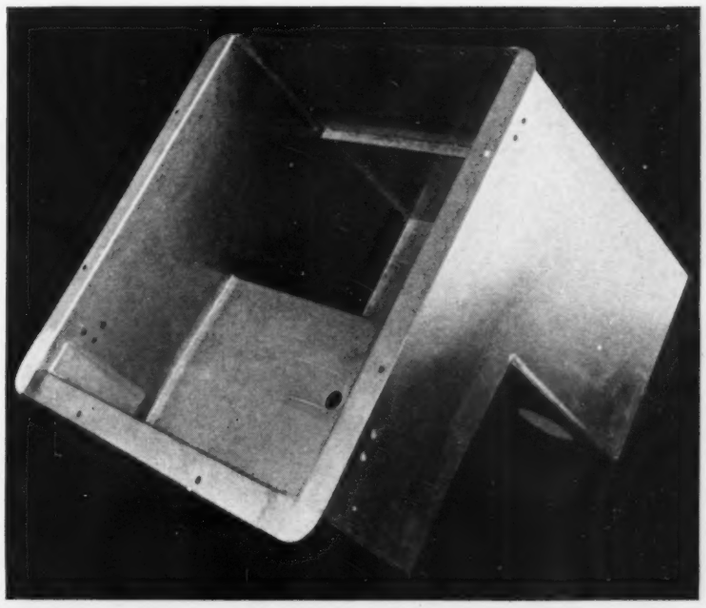
Advantages of arc welded construction: (1), no warp or distortion; (2), practically no damage to polished surface by welding; (3), a stronger and more rigid chamber is produced; (4), cleaning and grinding time reduced to a minimum; (5), labor costs reduced 10% over torch welding.

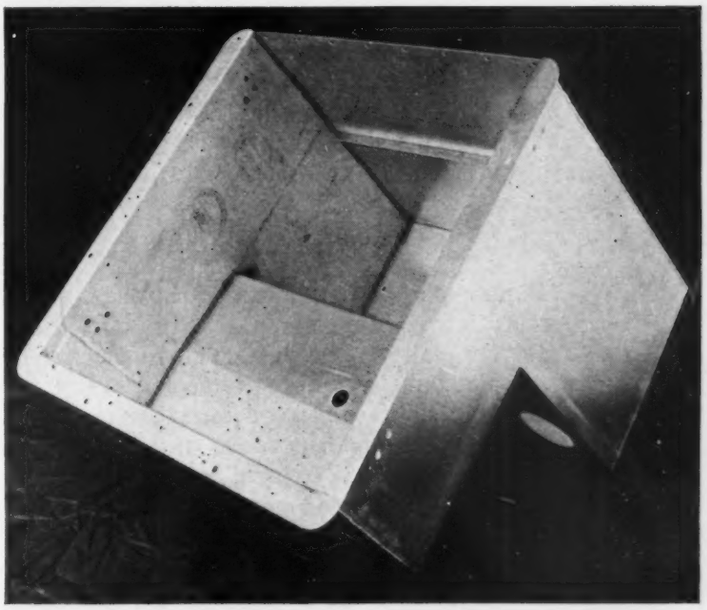
The second study covered the tank, chamber and frame of a dish washing machine. Tanks for this model are made either of 12-gauge galvanized sheet or 16-gauge 18-8 stainless steel. Chambers for this model are made either of 14 gauge galvanized iron or of 16-gauge 18-8 stainless steel. Frames are structural angles and gussets.

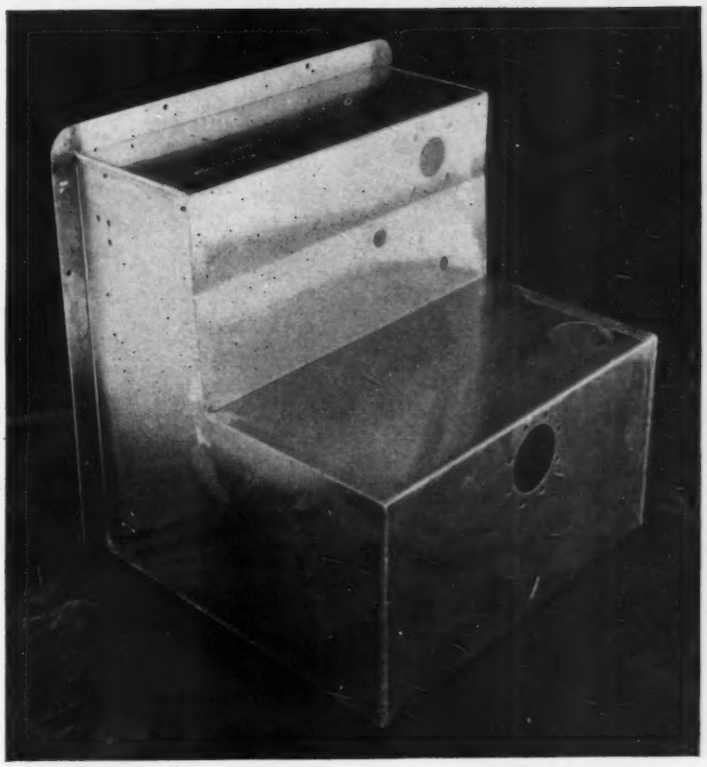
The old construction used for stainless steel is shown in Fig. 6. Note that the seams are riveted and then soldered. In the case of the galvanized iron tank the seams were torch welded working from the outside.

Fig. 7 shows the inside of a stainless steel tank of arc welded construction. Fig. 8 is a photograph of the outside of the same tank.

(*Continued on page* 112)







Fans for Handling Abrasive Materials

By H. M. Nichols
Manager, Conveying Dept., B. F. Sturtevant Co.

ALL material handling fans are subject to more or less abrasion of the fan wheels and housings; the extent and seriousness of this abrasion is dependent on a variety of factors. Fans exhausting from grinding wheels, sand-blast rooms, tumbling barrels, stone cutting tools, stone dryers, cement plants and similar applications are particularly subject to abrasion, as well as such applications as conveying sawdust, shavings, pulp-chips, metal chips, raw cotton, cut rags, shoddy, fishmeal, scrap rubber, etc.

Abrasion Can't Be Built Out

Experiments and studies made by the National Association of Fan Manufacturers have shown that there are no methods of construction or materials available which will completely protect a fan when subject to severe abrasive action; and, as the life of equipment under such conditions is of an indeterminate nature, the association has outlined its position as quoted in the two following paragraphs:

"To study the effects of abrasion, the Association for several years past has been investigating and experimenting with plate alloys, coatings and forms of construction. To date no materials or means have been discovered which will effectively and completely resist such abrasive action. Some materials are better than others. The resistance to abrasion then is one of degree only.

"Experience having shown on the basis of present day knowledge of the art that erosion, corrosion or results of excessive heat are speculative assumptions of maintenance, it is the policy of the Association to advise buyers of fan equipment that guarantees covering such conditions cannot be made in good faith."

Five Abrasion Solutions

In the practical working out of fan problems involving abrasion, the most common solutions are:

(1) Furnish standard equipment and replace necessary parts as wear develops.

(2) Furnish standard design with extra heavy parts and replace as necessary.

(3) Furnish fans as in (1) or (2) and when wear develops resurface worn parts with hard metals.

(4) Furnish fans of special design and with special materials.

(5) Furnish standard fans and provide means

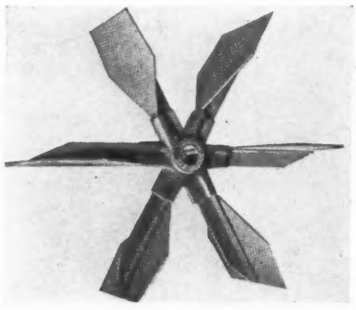
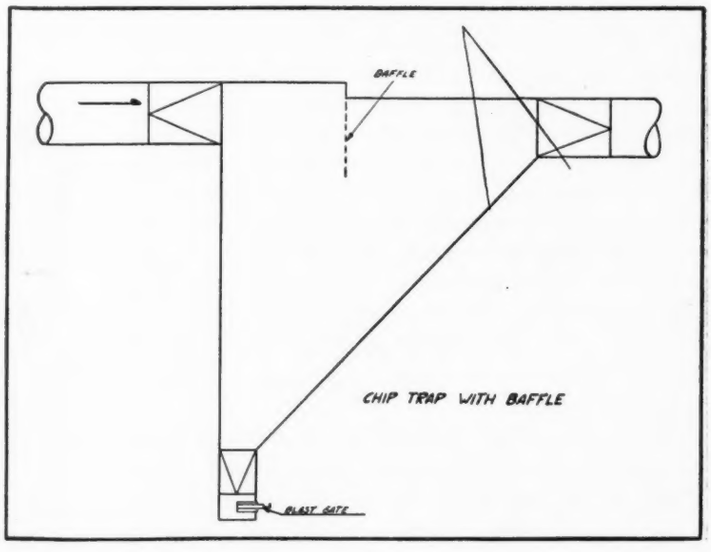


Fig. 1—Typical long shaving or paddle wheel fan suitable for handling abrasive materials. After wear, blades can be easily replaced or hard surfaced.



Right—Fig. 2—Trap in line to catch large or heavy chips which might otherwise injure the fan. Velocity is reduced by expanding air into trap; the baffle stops air flow abruptly.

of removing the abrasive from the air stream before it reaches the fan.

Where abrasive conditions are moderate the lower first cost favors solutions (1) or (2).

Hard Surfacing After Wear

Solution 3—Since it is impracticable to predict just where the cutting of fan wheel and housing will be most severe, the equipment is placed in operation and run until wear develops, at which time the places which show the effect of wear are surfaced with some hard material such as Stellite, the surfacing material being placed just where it is required by means of an acetylene welding torch. This method of protection is more commonly employed with large fans since on small fans the expense of setting up for the field-work would be of a much greater percentage of the first cost and usually would not be worth while.

Fans of special design and special materials are naturally high in first cost and often times it is more economical to use fans of standard design and materials, replacing worn parts just as one replaces an automobile tire at the end of a certain mileage.

"Paddle Wheel" Fans

Fans of simple design and construction are desirable since the cost of replacement parts is kept at a minimum. Long-shaving or open-paddle wheels (Fig. 1) are frequently used for handling abrasive laden air, since there are no sideplates to cut through and the wheels are low in first cost. Streamlining the fan inlet is also helpful since the streamlining has a tendency to deflect the abrasive stream away from backplate of the wheel. Wearing strips may be attached to the points of serious wear in the fan wheels and replacable liners bolted to fan housing. Wheels and housings are also provided with rubber linings.

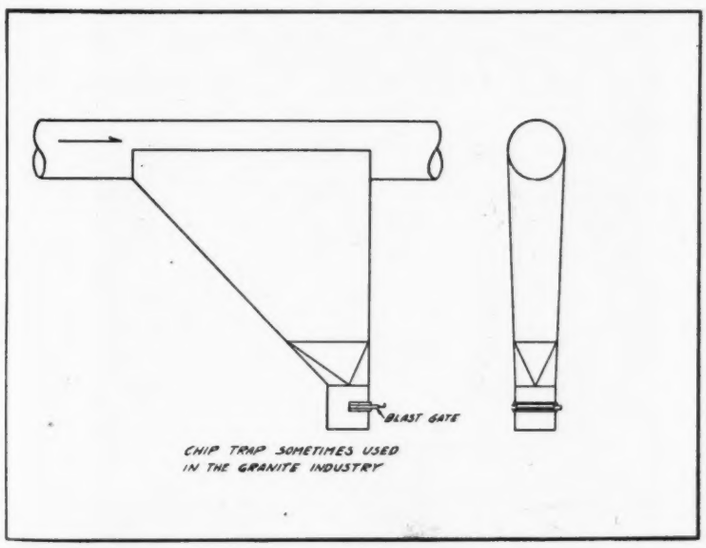


Fig. 3—Another type of line trap, not so large as Fig. 2 and sized for such heavy particles as granite or steel chips.

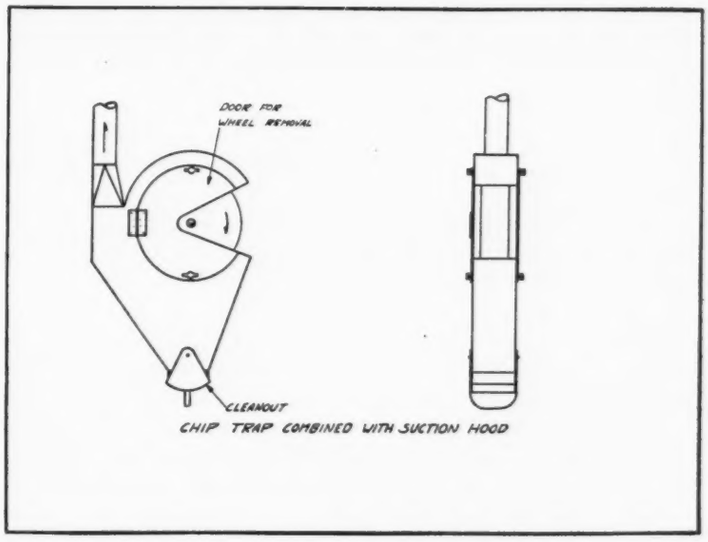


Fig. 4—Hood trap installed at the grinding wheel. The hood directs heavy particles down into the trap while lighter particles are carried away in the air stream.

Increased Speeds Means Increased Erosion

Erosion increases very rapidly with an increase in speed of the abrasive particles and thus it is desirable to keep all velocities as low as practicable. Do not use small fans at high rotative speeds as the life will be short. As a practicable illustration, small fans at 3450 RPM exhausting stone dust from granite surfacing machines were wearing out in two months. They were replaced with larger fans to handle the same volume of air at same pressure at 1750 fan speed and the owner then obtained an average life of two to three years.

A frequent method of protecting the fans is to provide means of removing the major portion of the abrasive from the air stream before it reaches the fan.

Where the material contains heavy chips, they may be removed by various types of traps as illustrated in Figs. 2, 3, and 4.

"Draw Through" Cyclones

Cyclone collectors may be operated as draw through, which usually reduces the dust concentration passing through the fan to 10 to 20 per cent of the original. Where draw-through collectors are used, the tail spout must be provided with a positive seal such as double locking gates with storage hopper, rotary valve or other types of seal.

For fine dust, cloth screen filters with the fans on the clean air side are nearly 100% effective in controling fan wear.

Copper Gutters, Vent Caps and Steel Fireplace Units In a New Orleans Housing Project

NEW ORLEANS' most imposing home building effort to date is the St. Thomas Street housing project completed last year. In the project there are 121 separate buildings having a total of 970 dwelling units or 3,794 rooms. There are also an administration building, gas meter house and four yard stations.

The size of the project as a whole is matched by the scope of the contract awarded Blattmann-Weeser Sheet Metal Works, Inc., New Orleans contractors. Blattmann-Weeser contract included as major items 20,000 feet of Transite vent pipe, 35,000 feet of gutter in three shapes, 1,000 steel fireplaces, more than 400 hot water heater vent pipe caps (of copper) in single, double, triple, quadruple and sextuple units, and several hundred feet of ducts for the fire place units.

The gutter, louvres, duct work and vent caps were made in the Blattmann-Weeser shop; the fire places were units purchased assembled; the Transite pipe is a brand product.

Gutter Construction

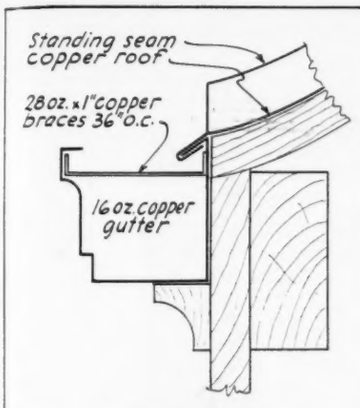
The gutter required consists of 5-inch and 3-inch half round single bead and 3 by 2½-inch molded, as shown in the details. These gutters are on the buildings proper and the entrance porches, as indicated. All gutters are 16-ounce copper with copper braces, hooks, shanks. For the contract Blattmann-Weeser fabricated 26,700 feet of the 5-inch half round; 1,700 feet of 3-inch half round and 7,210 feet of the molded section. All gutter was formed in 10-foot lengths and two 10-foot lengths were soldered together (see photographs) in the shop and the 20-foot lengths delivered to the job and erected. Porch gutters were delivered in exact lengths to fit the porch.

Copper Vent Caps

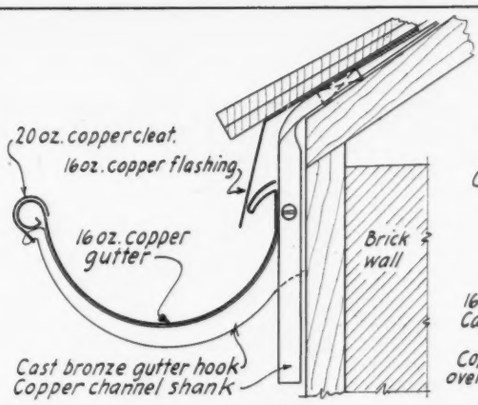
The original specifications called for Transite vent caps, but Blattmann-Weeser submitted suggestions for vent caps made in 16-ounce copper which were accepted. The details show construction of the single, double, triple, quadruple, sextuple caps required on the buildings. In general, this vent cap consists of a storm band around an inner hood, the two parts separated by wide bands and the whole fastened to the chimney by bronze metal screws running through the apron.

The contract required 196 single caps, 65 double caps, 60 triple caps, 85 quadruple caps, 21 sextuple caps. All caps were delivered to the job as complete units ready for erection and fastening.

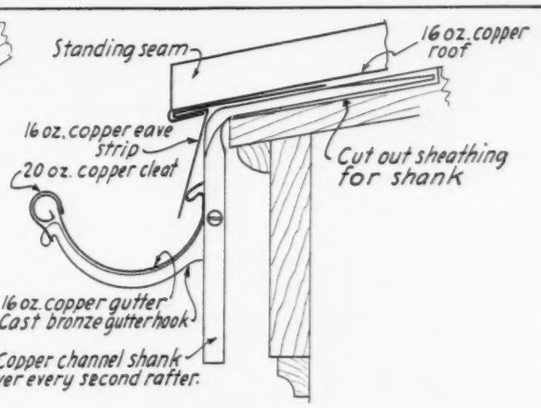
Molded porch gutters (copper) were soldered into complete units ready for erection. Special bench fixtures, as shown, were used to get a true assembly. Gas fired, portable coppers furnaces were used to eliminate delay.



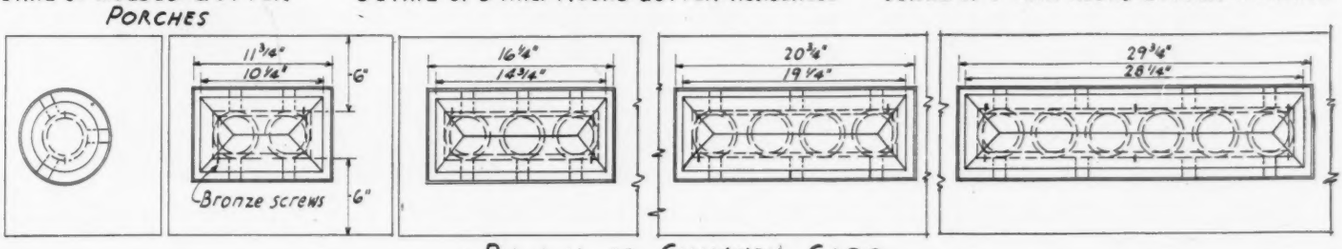
DETAIL OF MOLDED GUTTER-PORCHES



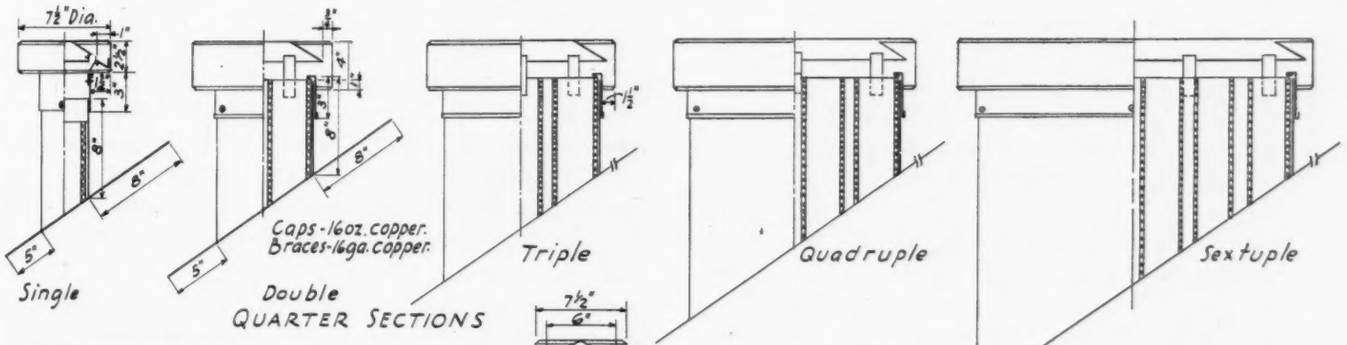
DETAIL OF 5" HALF ROUND GUTTER-RESIDENCES


Standing seam
16 oz. copper roof
16 oz. copper eave strip
20 oz. copper cleat
Cut out sheathing for shank
16 oz. copper gutter
Cast bronze gutter hook
Copper channel shank over every second rafter.

DETAIL OF 3" HALF ROUND GUTTER-PORCHES

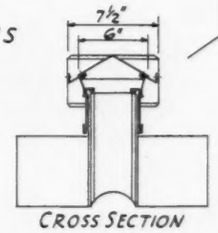


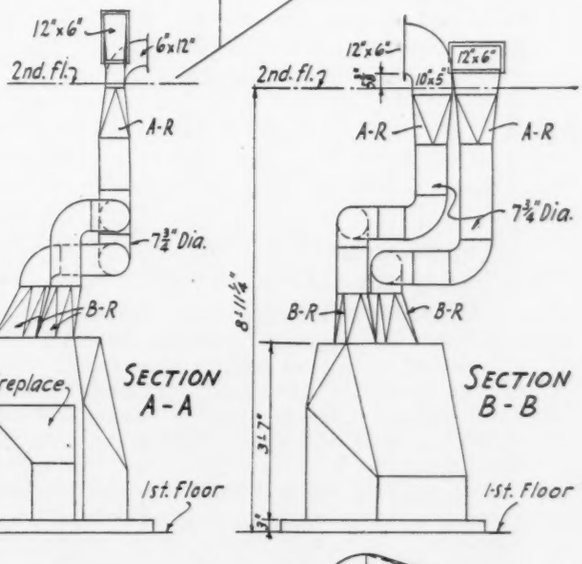
PLAN OF CHIMNEY CAPS



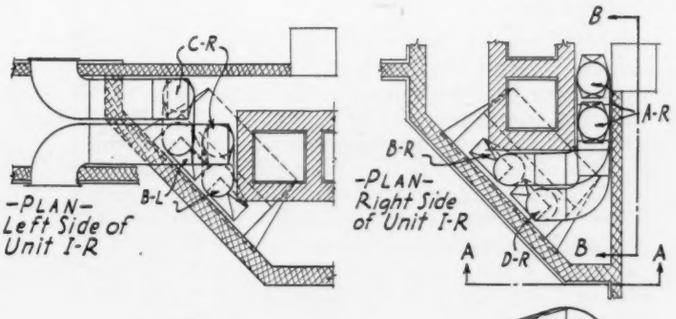
QUARTER SECTIONS

DETAILS OF CAPS FOR HOT WATER HEATER VENTS

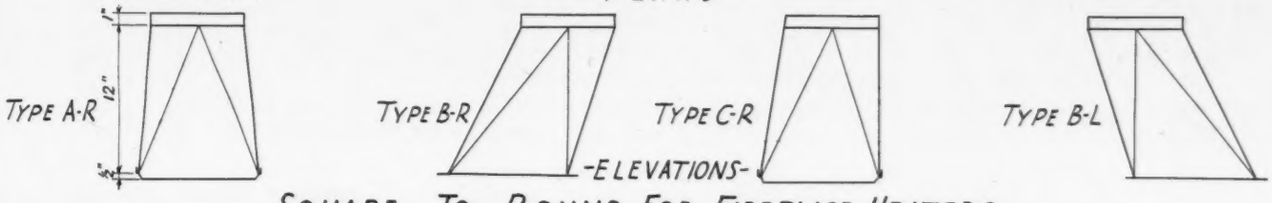




FIREPLACE DETAILS

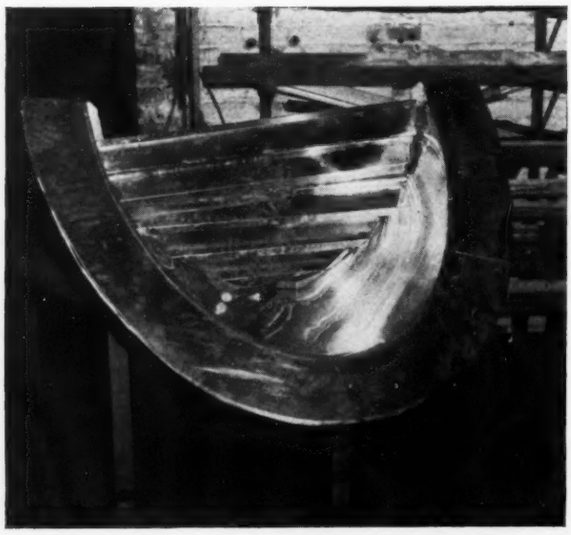


- PLANS -



-ELEVATIONS-

SQUARE TO ROUND FOR FIREPLACE HEATERS



Attic space ventilating louvres of copper were triangular and half round as shown above. Pieces were formed, assembled and soldered into complete units in the Blattmann-Weeser shop ready for erection. A single copper vent cap (see text and drawing) with flashing sheet stands in the foreground of the left photograph.

B-W Installs Steel Fireplace Units

A rather unusual part of the contract was the installation of approximately 1,000 steel fireplaces as shown in the drawing. These units, manufactured by the Superior Fireplace Company, were received ready for installation. Blattmann-Weeser, however, fabricated the warm and cold air ducts shown. These fireplace heaters are installed in all housing units, arranged, as shown, to take return air from the floor where installed. Grilles, over the front, introduce warm air to the fire place room and, in addition, warm air is introduced in rooms above the fireplace by means of risers and registers. The duct work required for this arrangement is shown in the elevations. All of this duct work was 24-gauge galvanized iron covered with 12-pound asbestos paper after erection.

Vents for the fireplaces are 3-inch Transite with standard fittings. Some 430 long leg tees, 540 short tees, 970 drip caps, 280 90-degree elbows and 20,000 feet of pipe were needed to vent the fireplaces through the vent caps previously described.

Louvered ventilators in half round and triangular shapes were made in copper for the buildings. These are shown in two photographs. There were 426 triangular and 354 half round ventilators fabricated and installed.

The Aluminum Situation

RIGHT this week, there is no shortage of aluminum for national defense, although civilian applications have been materially curtailed. This reduction in civilian uses has affected many readers who have, because of the pressure of defense demands for aluminum, been forced to accept substitutes for the duration of the war.

Just how long we will be able to say "There is no shortage of aluminum for national defense" is problematical. There may be a shortage next month, in six months, in a year. It depends largely on plane production, not only for the United States but for Britain as well. According to a recent announcement by W. S. Knudsen, the expanded plane program will require an annual production of 1,600,000,000 pounds of aluminum. The best available estimates indicate that this is more aluminum than the whole world produced last year.

Aluminum production in the United States during 1939 was 327,000,000 pounds. Domestic production at present is at the rate of nearly 600,000,000 pounds annually, and by July, 1942, will reach 825,000,000 pounds a year. Until recently, Aluminum Company of America was the sole producer of primary aluminum in this country, and by July of 1942 it will have completed a national defense expansion program which will more than double the production built up over a half century of operation. In 1942, the company's production of new metal will amount to more than 720,000,000 pounds; and to reach this production, as well as to expand fabricating facilities, the company will have expended $200,000,000, all of which it is financing itself.

The forging capacity in the plants of Aluminum Company of America has been increased approximately 175 per cent; extruded shapes capacity, sheet capacity, and tubing capacity have in each case been more than doubled; while wire, rod and bar capacity is up 130 per cent, and sand casting capacity is now approximately 200 per cent more than it was at the start of the war in September, 1939.

Douglas B. Hobbs,
Aluminum Company of America.

Planning Work for Students in "Streamlined" Sheet Metal Training

By Ernest E. Zideck
Instructor, Technical School, Jackson, Michigan

THE first step in all sheet metal work is the *planning*. Planning may be done by architects, plant engineers and heating-ventilating-air conditioning experts in work done by the legitimate sheet metal shop. Work done in factories making metal furniture or auto and plane bodies or other sheet constructions may be planned by the respective engineering departments of the factories; or, as pertains to armaments, by the army and navy engineers.

But sheet metal work for training under the National Defense Training Program, or for students in the Vocational Training Course offered by the Public School System; this sheet metal work must be planned by the instructor himself. It must be planned by the instructor because, under the emergency, he is called upon to train workers in sheet metal during a training course lasting but a few months and, because of the emergency, old methods may not be suitable.

Plan a Practical Course

What constitutes *planning* of work for the class rooms? First, the instructor must bear in mind that the trainee, when certified for employment, will step into an environment of systematic activity; of work done swiftly by machines; of work done in a routine way, under a discipline imposed by the shop rules and largely enforced by the unions if the shop happens to be unionized. The student, then, if he is to benefit from the training given him, should be acquainted with shop methods and the routine of production, and accustomed to conditions similar to those prevailing in shop and factory.

Making the student acquainted with the atmosphere and with work as it is done in shop or factory is an important step forward in instruction because under our emergency economic conditions the student will, in all probability, work in a shop or a factory after graduation. He can have little hope of being able to start a shop of his own. Nowadays the graduate from a sheet metal school must seek employment in a sheet metal shop or a sheet metal fabricating plant, and, obviously, submit to rules and do work by standards existing and not by his own notions of work.

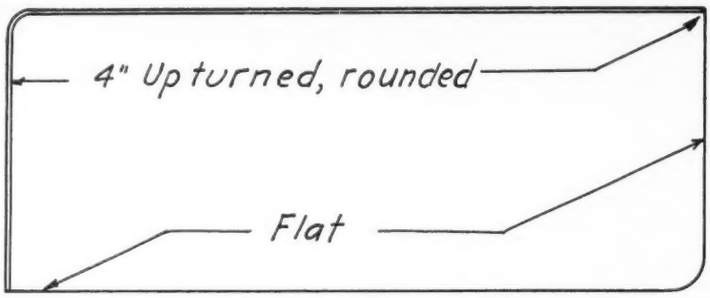
Insist on Painstaking Workmanship

The second step in planning work for students is to select items of practical value which can be made with the equipment at hand and yet follow the general practices of the trade. From these trade practices the instructor should not deviate, because the student-graduate will be required to work by them after leaving school.

Younger students will almost without exception try to construct things their own way. Their's is a tendency to experiment, to shy away from the more laborious, correct operations or modes of construction and engage in slip-shod work by which they figure to accomplish quicker results. This tendency the instructor must combat from the start, insisting on the proper methods in preparation of the metal for lapping, or seaming, or riveting, as the case may be, and for soldering or welding. The work planned for the students to execute must be systematically planned, with choice of standard operations, one following the other in proper routine, each executed without fault, each in its turn contributing to the faultless construction of the whole.

Select Usable Items to Fabricate

The third step is the choice of items for manufacture which do not fall under the restrictions imposed on the sale of goods made in a school. At the same time the instructor must not, under any circumstances, let the students work on something destined to be junked. No buildings may be erected nor cars or planes constructed in a school shop, except in miniatures, and the instructor should abstain from engaging the students in this kind of work. Not that such work need be wasted. It may be exhibited—as is done —somewhere in the school building, for visitors to marvel at the students' accomplishments. Such work, however, no matter how well done or how



Teachers and office workers will appreciate the simple book holder illustrated above. It is made of 20 ga. auto body steel, enameled to match the color of the desk. If a spot-welder is available the rim may be provided with a flange at the bottom, turned inside and the flat portion may be off-set to receive the flange, preventing the sharp edge of the flange scratching the table.

Large volumes are placed edge-wise, leaning against the 4 inch high rim at the left and then leaning one against the other. Titles may be read and books selected easily. The desk may be dusted by moving the holder to one side, all the books being moved with it.

Students in a sheet metal class advanced to practice on well finished office furniture will find the above an article of merit.

eagerly executed by the students, does not train them in the really important operations of shearing-cutting and preparation of the metal for provisioning, braking-forming, fitting-joining and finishing of the manufactured goods for the market.

Items which the students may make in the school msut be limited to articles wanted by the schools, in school buildings, or by a number of teachers and students themselves, to be used in their homes. There is a vast variety of sheet metal products which may be so placed. For really useful products, such as lockers, the school board should be willing to furnish the materials. For useful things which may be placed on the teacher's desk or used by them in their homes they likewise should be willing to pay the cost of the materials.

Machine Instruction from Catalogs

It will not do for the instructor to plan production of funnels, for instance, because funnels may be bought, better made than the class could make them, at the 5 and 10 cent store. Planning should be for items which can not be bought, at low price and better made, in the hardware store. There are a number of sheet metal articles usable in the school building, by the teachers and in the students' homes which the legitimate sheet metal shop would most likely decline to make singly or in small lots. These items, then, may be taken up by the school.

The fourth step in planning should be a study of manufacturers' catalogues and illustrations and descriptions of modern machinery and tools used in sheet metal work and of variated products made in shops and factories. Since the school's equipment is limited and items confined to a certain number of smaller constructions, instruction should be supplemented by interpretations of the illustrated and described means and products. Doing work on the school's squaring shears may be accompanied by instruction relating to the large power shears and diverse cutters by which work is done in the shop or the factory. Work on the folder, the rollers and the brake should be supplemented by explanations of the power brake, the press brake, the machinery by which such formations are being accomplished elsewhere. Punching holes by hand or drilling holes and filing slots present opportunities for displaying pictures of presses and explaining the uses of dies in such work. Lapping and soldering, seaming and riveting work invites the showing of machines doing spotwelding and acetylene and arc welding and calls for explanations of how, in modern sheet metal work, more and more spot and other welding and less and less seaming, riveting and soldering is being done. Abrasive finishing machinery and tools and enameling processes and means may be interpreted to the

students, such instruction preparing them for work in the outside shop.

The fifth and final step in planning instruction is the preparation, by the instructor himself, of paper layouts and working charts by which, systematically, the labor of each of the students and the combined operations of the class will result in the desired product. Keeping the students busy, diligently performing work given them, is the instructor's greatest problem. Once the teacher has succeeded in keeping the student's mind and hands wholly occupied with the work in progress, he has solved the most difficult task confronting a vocational teacher.

Working Charts Insure Respect

Preparing working charts for each item and operation in advance of the day's course of instruction; embodying in the charts or plans the standards of construction practiced by the trade; and proceeding to give the students precise, unmistakable directions contained in the charts will impress the students immensely. They will respect the instructor and follow willingly his guidance and introduction to other work. Nothing is more damaging to the reputation of the instructor, and to the morale of the class, than the instructor's own uncertainty, vacillation or outright error or failure. That is why it is well for the instructor to *prepare* for the day's tasks before hand. Surrounded by twenty restless students, anyone is liable to confuse things done in a hurry.

As an example, constructing a dozen drinking cups to be used in the school. It is too late for the instructor to try to determine the shearing, reinforcing, forming and joining of the several parts of the cup after the class has started. While he tries to do the layout of the parts, their dimensioning for shearing, the students stand idly by and lose interest. The hurried layout and directions most likely will lead to faulty notching for laps, the bottoms too large or too small to fit, the handle badly matching. The students will be impressed by the inadequacy of the layout and of directions, wonder at the re-working necessary, become disgusted with the additional, obviously uncalled for effort of making the parts fit, regard with contempt the assembled cup—its appearance far from that of the cups sold in the dime store.

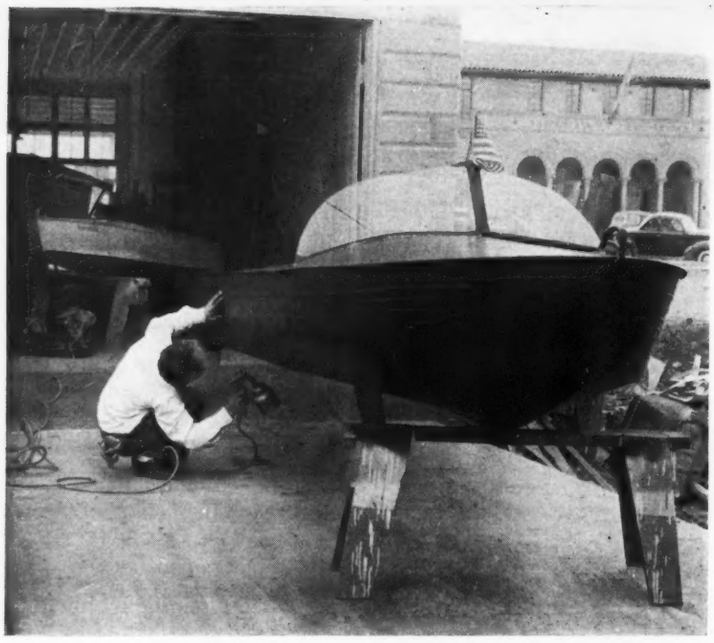
It should take the instructor versed in sheet metal work only a fraction of an hour to prepare the working data and the directions for the construction of the drinking cup in advance of instruction. Precise directions to the students of what to do and how to do it when the class opens results in the students going immediately to work and working on the task confidently, expecting unmistakable results. No misfits forthcoming, the parts fitting snugly, the twelve drinking cups will be assembled and soldered quickly and the whole class gratified by the achievement.

Instructors Deserve Pay for Homework

True, the preparation of layouts, charts, and patterns, possibly, would have to be done on time for which the average instructor is not being paid. It is a case worthy of consideration by the respective authorities. If the instructor—under the emergency training program, for instance—is being paid an hourly wage on the basis of instructing the class six hours daily, he will spend six hours in the class room and no more. He may shy at doing work for the school for which he receives no compensation. Why not pay the instructor for seven hours and obligate him to do the preparatory work during the seventh hour?

But irrespective of whether paid for preparatory work or not, the instructor who wants to succeed will do the preparatory work regardless. He will be rewarded by the high esteem the class will have for him. He will be compensated for the extra work he does by the orderly, disciplined proceedings in the class room and the smooth flow of work done by the trainees. He will be vastly relieved of pressure during the instruction hours. Planning for the next day's tasks before hand will prove a very important link in the general planning of an instruction course in sheet metal work.

We have been asked by readers to outline articles to follow in Mr. Zideck's series. Approximately, future articles will cover—Shearing—Cutting; Provisioning; Braking—Forming; Fitting—Joining; Welding—Brazing—Abrasive Finishing; and possibly a final article on Finishes and Assembly. Each article will contain necessary drawings for a practical article to be made in a "streamlined" training course.



Six-Passenger, Sheet Metal Fishing Boat

By Jos. C. Coyle

NEATNESS and stability are prime features of this six passenger galvanized metal fishing boat, built by David Blevins, Sheet Metal Shop, of Yuma, Arizona. It is 14 feet 6¾ inches long, 52 inch beam, and is built for around $120.00. The motor is mounted in a recess between two air tanks at the stern, to eliminate pull-down, and is controlled by cables from a wheel at the front seat. Ample buoyancy is provided by five more air tanks, one under each of the three seats and a space 36 inches long which occupies the front end of the boat. A neat plate glass windshield is a distinct addition to the beauty of the craft.

Bill of Materials

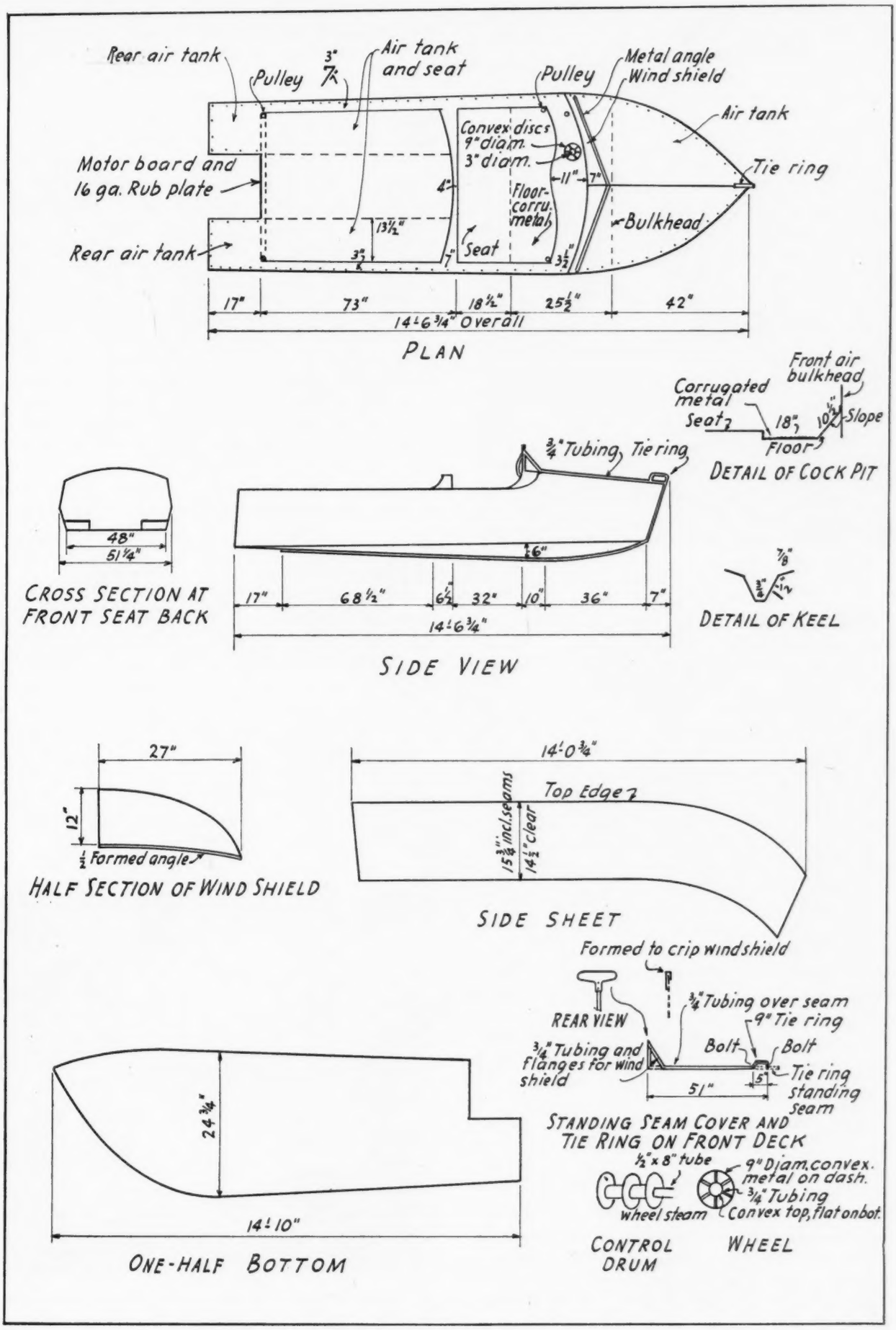
The materials used consist of twelve sheets (36x96 inch) of 24 gauge; three-quarters sheet of 20 gauge; a 54 inch by 13 inch piece of 18 gauge; 15½ by 15½ of 16 gauge metal. Also 2,600 2 lb rivets; 22 lb of half and half wire solder; two 12 by 28 inch panes ¼ inch plate glass; 54 inches rubber windshield channel; 76 inches ¾ inch steel tubing; 1¾ by 10½ by 46 inch motor block (wood); ¼ inch soft wire cable. For finishing, ½ gallon metal primer; two quarts blue lacquer; four 2½ ounce cans of striping gold for the top deck and striping.

The sheets are laid out with a metal scratch awl, tinner's rule, square and dividers, etc., and cut to shape with snips. The two bottom pieces, 13 feet 11¾ inches long, are joined with a ¾ inch standing seam through the middle. The metal sheets being only 96 inches long, splicing is necessary, using a ⅝ flat lock seam, located at discretion of the builder near either end of the boat. Both sheets curve for one third of the length, as shown in the drawing, with a maximum width of 24¾ inches at the beam line. The side sheets are 16⅛ inches by 15 feet 9 inches overall, seams included. Ornamental beads are made with a beading machine. A third of the length is cut on a curve to warp into place properly. Double lock ⅝-inch seams are formed on a brake, to join the side sheets to the bottom.

Preliminary Construction

The bulkhead for the forward air tank is next riveted and soldered in place. A sloping sheet 11 inches wide, for the feet, is soldered to it and to the floor and side sheets. Back of it is installed a corrugated sheet 17 inches wide (¼-inch corrugations). Then comes the front seat, with air tank beneath it. It is 18½ inches wide and 2 inches off the bottom, flanged and soldered to the sides and the bulkhead installed as a seat back. Between this seat back and the stern a 5 inch by 12½ inch by 75 inch seat tank is installed on each side.

Across the rear end, just over the ends of these air tanks, the motor block is next installed. Except for a 6 inch square space where the motor clamp fits, it is completely covered with metal, applied with wood screws. At this time the two rear air tanks are also built in. They are 15¾ inches wide, leaving a 14½ inch space between for the outboard motor. This space on the board is covered with an extra sheet of 16 gauge steel to take the rub of the motor. The tanks are 17 inches long on the bottom, 15 inches at the top


Rear air tank
Pulley
3"
Air tank and seat
Pulley
Metal angle Wind shield
Air tank
Convex discs 9" diam. 3" diam.
Motor board and 16 ga. Rub plate
Tie ring
Floor-corru. metal
Bulkhead
Rear air tank
Seat
17"
73"
18½"
25½"
42"
14'-6¾" Overall
PLAN
Front air bulkhead
Corrugated metal Seat
18"
Slope
Floor
DETAIL OF COCK PIT
¾" Tubing, Tie ring
48"
51¼"
CROSS SECTION AT FRONT SEAT BACK
17"
68½"
32"
10"
36"
7"
14'-6¾"
SIDE VIEW
DETAIL OF KEEL
27"
12"
½ Formed angle
HALF SECTION OF WIND SHIELD
14'-0¾"
Top Edge
SIDE SHEET
Formed to crip windshield
REAR VIEW
¾" Tubing over seam
9" Tie ring
¾" Tubing and flanges for wind shield
Bolt
Bolt
Tie ring standing seam
51"
STANDING SEAM COVER AND TIE RING ON FRONT DECK
24¾"
14'-10"
ONE-HALF BOTTOM
½" x 8" tube
9" Diam. convex. metal on dash.
¾" Tubing
wheel steam
Convex top, flat on bot.
CONTROL DRUM
WHEEL

View of rear and bottom showing keel, reinforced end for outboard motor, rear air tanks and soldered seams.

and 14½ inches high. All tank seams are swaged with a swaging machine and riveted, rivet holes being made on a drill press when possible, otherwise with a pistol grip drill after assembly. Rivets are set with hand tools. Seams which will be covered are soldered first.

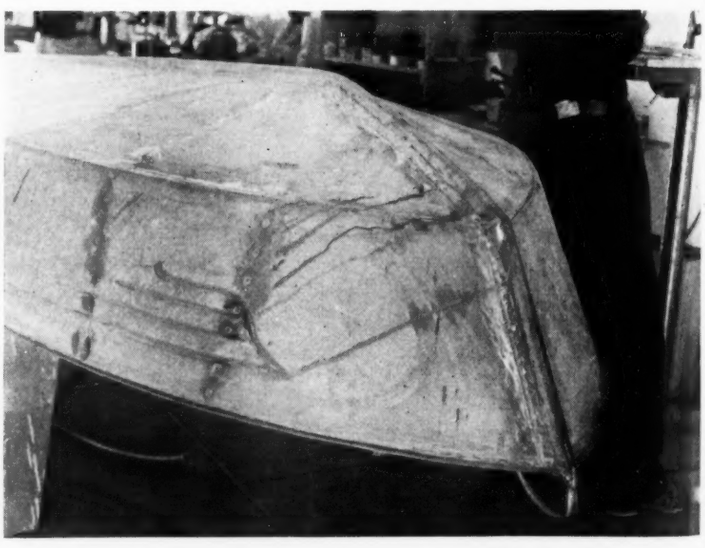
The dash, with control wheel and a push switch grounded to the dash by a soldered wire for cutting out the motor, is installed next inside insulating tube leading to motor. The wheel is made up of 4½ inch spokes of ½ inch tubing (tipped with rubber), with an 8 inch stem of ½ inch tubing welded in. The bottom end of this stem has a small drum for either single or double control wires. The wheel center is housed between a 3 inch flat disc beneath and a convex disc of the same size on top. A nine inch convex disc housing is soldered to the dash, around the wheel stem. From the drum of the wheel the control wires lead over small pulleys at the rear of the dash, into the space in the boat sides, and thus to the front of the motor board, where they are brought through other small holes and similar pulleys to the motor. The electric wire to the cut out button also follows this course.

Deck—Windshield Construction

The forward deck, arched 4 inches at the rear, is next applied in two sections, with a ¾ inch standing single lock seam. It is 49 inches long at this seam. The seam is covered by a section of split tubing from the tie ring to the windshield. The rear end of this tubing is bent upward for the middle of the windshield, and welded to a vertical section of similar tubing at the seam end. Top of the vertical tube is left open for a pennant staff. A formed metal section welded to it grips the two sections of windshield at the top. Metal strips welded to the sloping tube cover the windshield joint down to the deck. Windshield edges are fitted into the usual rubber channels and a ½ inch steel angle, welded to the deck, covers this in front. The two plate glass sections of windshield are cut on a curve, as shown in the drawing. The tie ring is made from ¾ inch tubing, split on the ends and bolted as well as welded to the standing seam.

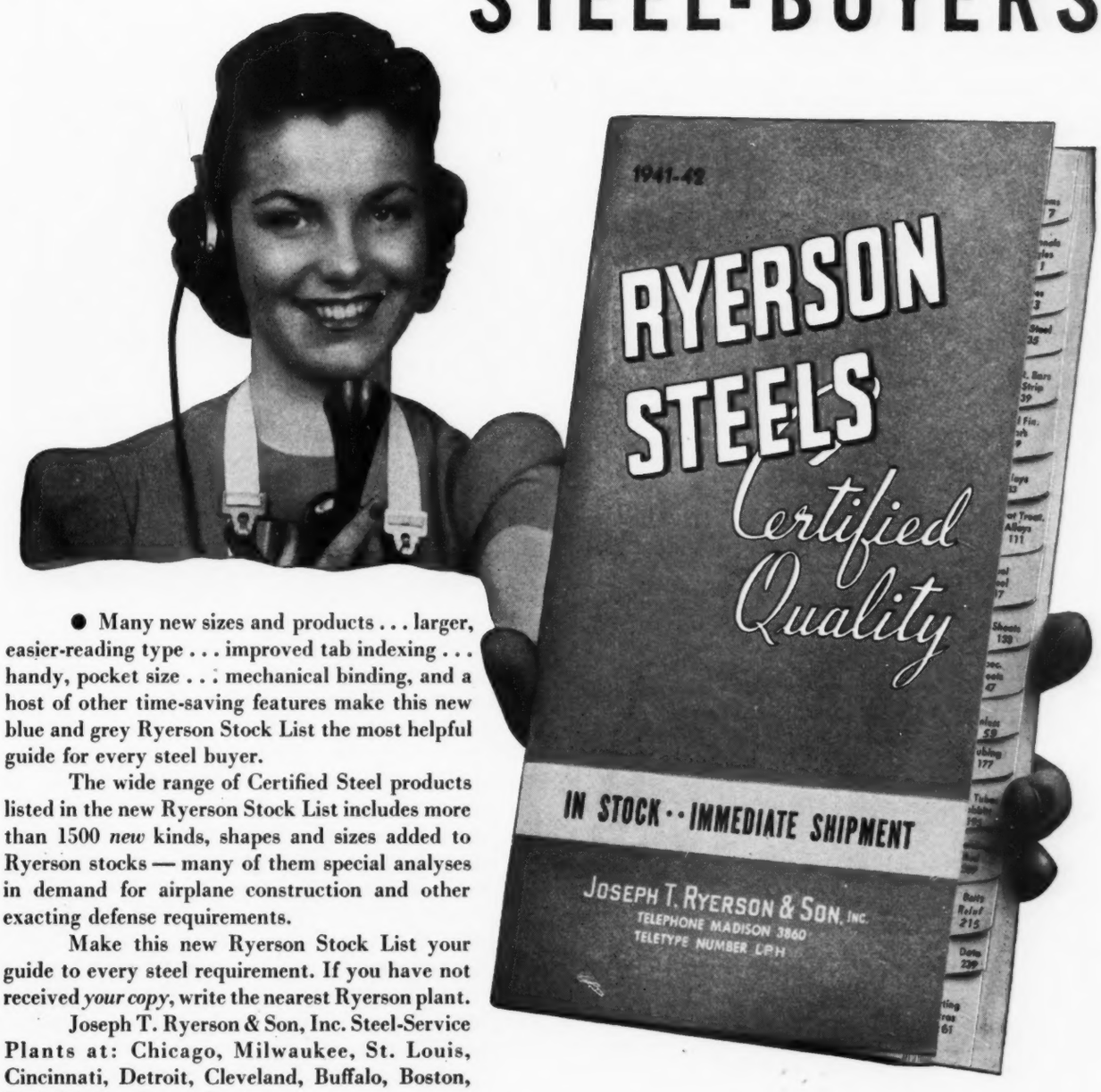
Throughout the open sections of the boat the sides have a formed top, 3 inches wide and extending 7 inches down the inside, where the edge is riveted. The curving cover to the front seat back is also riveted, as is the ⅝ exterior cover seam entirely around the boat. Before finishing all rivet heads and seams are soldered, then ground smooth with a hand grinder. While the boat is upside down a formed metal strip is applied over the keel seam.

Quick drying auto lacquer was used in finishing. The galvanize was first removed with blue vitriol. After drying 4 hours the surface was wiped off with a rag and metal primer sprayed on. This dried in 45 minutes and was then sanded with 00 paper. Dust was blown off with air and the first color coat sprayed on. After 45 minutes this also was sanded lightly with 00 paper and blown off. The second coat after drying 45 minutes was rubbed with Acme quality rubbing compound. The surface is then ready for polishing or waxing as desired. The interior received primer only. The top is stripping gold and the sides blue, with a gold stripe over the beads.



Prow and bottom showing contour of forward bottom, the keel, anchor line eye and soldered rivets which hold forward bulkhead in position.

New Guide for STEEL-BUYERS



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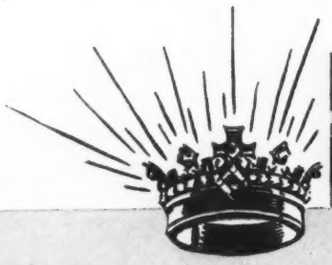
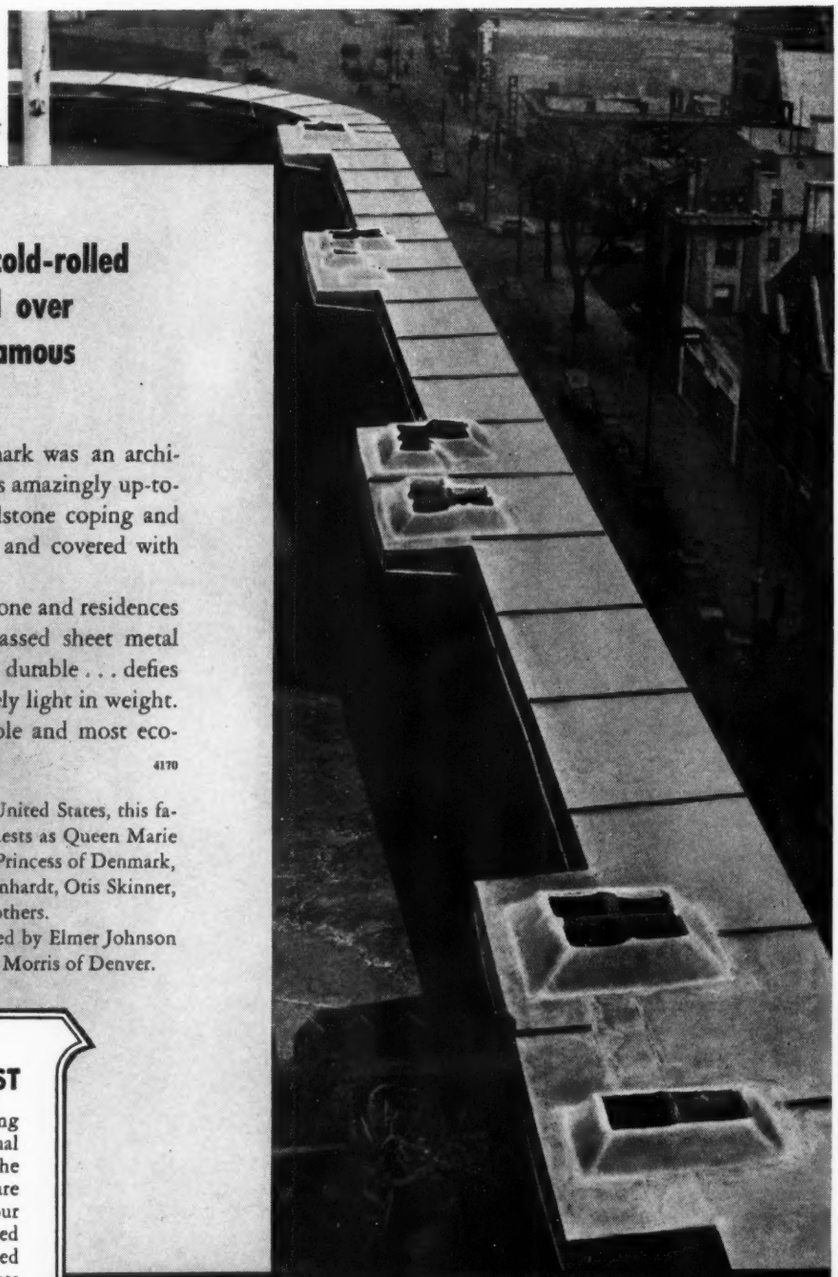
Host to royalty*, Brown Palace Hotel gets copper over coping and parapet





10,000 lbs. of 16-oz. cold-rolled Anaconda Copper used over original masonry on famous 50-year-old hostelry

This Denver, Colorado, landmark was an architectural triumph in 1891, and is amazingly up-to-date today. Recently the sandstone coping and parapet work was sandblasted and covered with Anaconda Sheet Copper.

For large buildings like this one and residences as well, copper offers unsurpassed sheet metal opportunities. It is rustless and durable . . . defies time and weather . . . is relatively light in weight. Best of all, it is easily workable and most economical in service. 4170

*Besides many Presidents of the United States, this famous hotel has entertained such guests as Queen Marie of Rumania, the Crown Prince and Princess of Denmark, Marshals Foch and Joffre, Sarah Bernhardt, Otis Skinner, Florenz Ziegfeld and hundreds of others.

The new copper work was installed by Elmer Johnson of Denver. The architect was Earl C. Morris of Denver.

DEFENSE COMES FIRST

Copper and copper alloys are playing an indispensable part in the National Defense Program. Recognizing the responsibility placed on us, we are exerting every effort to fulfill our part in the tremendous task created by the emergency. In the United States and Canada, our ten plants serving important industrial centers are working to the limit of their ability to increase the output of products for which the demand is greatest. We feel sure consumers will appreciate the problems which confront us and will cooperate fully in our efforts to plan production beyond defense requirements so that all customers will receive every consideration.

ANACONDA

Anaconda Copper

THE AMERICAN BRASS COMPANY, General Offices: Waterbury, Conn.
Subsidiary of Anaconda Copper Mining Company
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Woodwork and Curtains Turn Yellow

American Artisan:

Several years ago we installed a gravity steel furnace and a gun-type oil burner. Last year we added a blower-filter unit. Our customer now complains that snow white curtains and woodwork turn a saffron color. He proves this by placing white cheese cloth under a register—the cheese cloth turns yellowish within a few hours.

The customer has never complained of fumes or gas and insists there is no odor present. We have made minute examination; given smoke tests with and without the burner operating and can discover no leaks. There is no evidence of dust leaking through or by-passing the filters. Inside surfaces of the furnace casing and bonnet are clean.

Has anyone any suggestions?

R. E. B., Ohio.

Reply by
S. Konzo
University of Illinois

One or two experiences of this type have about convinced me that if all other obvious remedies fail, the best recourse is to tear down the entire casing, burner, and furnace and either install a new unit or else reassemble carefully the old unit. I presume he cleaned out the pipes and returns on the job before he added the blower. Swab out the stackhead and examine the cloth. Is the dirt greasy? Does it smell oily? Apply match to the burner fan opening and see if burner is back-firing either due to lack of draft or to pulsation difficulties.

Reply by
E. F. Fuller
E. F. Fuller Engineering Co., Nashotah, Wisc.

Not having seen the job, or having been able to inspect and test same, your guess is as good as mine; however, judging from other installations using the same burner I have inspected in this area, it is possible the burner leaks oil, and the oil may have flowed under the furnace casing, evaporating between casing and furnace.

A very small amount of sulphur in the fuel oil would cause discoloration in white cloth over registers, without perceptible odor.

Reply by
E. S. Buck
Ft. Wayne Air Conditioning Co., Ft. Wayne, Ind.

The experience of your reader, with white woodwork and curtains turning saffron, is unique. His smoke tests of the furnace and burner, while operating, should eliminate these items as possible causes.

Ordinary air, as we usually find it, will not cause such a condition, however high the temperature may be.

He must look for some source of contamination of the air. We might suspect the filters. Test with these removed. If the condition persists, block off all returns, run without filters and with the fan access door open and the basement windows open, on the theory that it may be something hidden in the returns.

Did he explore the external surfaces of the furnace itself? Something may have been placed on a hot surface, to cause gas formation.

Sabotage is always a possibility. We had two units develop certain peculiar failures of the metal used in the heating surface, we sent a chemist in to get samples of the remaining units. Tests showed a definite and unmistakable hydrochloric reaction.

This Was the Real Trouble, Writes R. E. B.

In a last desperate attempt to discover the source of the discoloration we dismantled the entire plant, blower and all. Dismantling the blower was the best idea we ever had, because we discovered an almost invisible film of light yellowish oil on the blades and the inside surfaces of the blower outlet nozzle completely covered with the same substance. We then discovered that our customer had motor trouble shortly after the blower was installed and the electrical contractor who replaced the motor blamed the failure on lack of oil in the motor bearings. Our customer readily admitted that since then he has freely oiled both motor and blower bearings about once every two weeks with **sewing machine oil**, even showing us the can and pouring some out for us.

That sewing machine oil was running through the porous bronze blower bearings like water, through the blower intake and spraying like mist on the hot furnace body, leaving practically no residue whatsoever and continuing on up the warm air pipes in vapor form. This highly refined oil really burns clean. Needless to say, we were plenty disgusted with this job and are happy to have found the solution at last. After washing all blower parts with naphtha and reassembling the discoloration has disappeared and the owner satisfied. Total cost to us, about $25.00 in labor and material. Take that off the original installation cost on the blower of about $165.00, three more like that and we are going to retire.

Low Register Air Temperature

American Artisan:

We are concerned over low register air temperatures when systems follow the Technical Code on recommended number of air changes per hour. For example, we are figuring a house, completely insulated, and a low ratio of Btu loss to cubic content. The heat loss, including the garage, is approximately 110,000 Btu. The total cubic content is 24,000 cubic feet. On the basis of six air changes per hour the register temperature is 110 deg. We find that 110 deg. register temperature with baseboard registers causes disagreeable drafts. Many of our customers will not accept high side wall registers. Our only solution is fewer air changes and higher register temperatures.

What did the founders of the code have in mind when they speak of air changes? In our calculations we total the Btu loss and figure the total cubic content and arrive at a factor and an average register air temperature. We tell our customers we are giving six air changes per hour throughout the house, but we have large rooms with low heat loss and small rooms with high heat loss and we know this means too few or too many changes.

As an example, we have a living room with 3,000 cubic feet and a heat loss of 6,300 Btu. This gives approximately 2½ air changes. Adjoining we have a sun porch with 1,350 cubic feet and 18,000 Btu loss and about 18 air changes per hour. Second floor rooms with cold ceilings all have higher proportional heat losses than protected rooms below.

We have been told about a method which regulates the

register air temperature in each room so that a constant number of air changes will exist. This is done by by-passing part of the air from the blower without heating the air and running individual ducts to each room. We would like to know more about this idea.

A. W. M., Canada.

Reply by The Editors

We fear that we can offer no specific remedy for the condition, excepting as you yourself compromise the suggestions and arrive at a practice which is satisfactory to your conscience and to the owner's comfort. First of all, with regard to air changes you realize that while this industry does a lot of talking about five or six air changes per hour, the assumption is that the fan runs constantly, whereas in practice, according to all records we have seen, if the fan runs 20 minutes out of the hour in an average day in the vicinity of Chicago, we are providing about all the air turnover possible.

When the code was originally planned, the engineers felt that with insulated houses the designer too often sticks to his favorite register air temperatures with the resulting decrease in air change, and so the code was written in such a way that the designer would have to consider an adequate number of air changes for ventilation before he arrived at a register air temperature.

This is all very well, but as you say, when 110-degree air temperatures from baseboard registers at 300 feet velocity or up strike the customer's ankles, there is cause for complaint. Now as to remedies, the first remedy would be the use of high sidewall registers with higher velocities so that there will be a positive mixing of room air and register air above the occupants' heads. You say you can not sell high sidewall registers, so this is out of the question.

There is only one way in which a small room with a high heat loss and a large room with a low heat loss can be taken care of without compromise. Our method of compromise is to favor the room most occupied. In this part of the country, sun porches are usually considered "nice" rooms, but when the weather gets cold the family moves indoors. Therefore, we compromise on the living room and set our air changes for the living room, leaving the sun room to come as it will.

With regard to a method whereby air flow can be kept constant and register air temperature varied according to the heat loss of the room, this can be done by by-passing part of the air from the blower around the furnace and placing at the junction of the by-pass and the warm air pipes a mixing damper, which is controlled by the room thermostat. Obviously, you have to have a damper for every thermostat and in the case of your house with the sun porch and living room, you should have two thermostats and two mixing dampers and two zones.

It is our contention that zone control is the best way to handle the house having rooms of widely different heat loss. In the house you mention, we would have the sun porch on one zone and, we would probably have to raise the bonnet temperature to above 150 deg. in order to reduce the number of air changes required for this room. Therefore, it seems to us that nearly constant air flow will be the answer to the sun porch. The living room and perhaps an adjacent room or room directly above could be handled on one zone or the bed rooms which you say have a high heat loss could be zoned on one thermostat.

In conclusion, we ourselves have never been too much concerned over air change. If infiltration will give one to one and a half air changes per hour and the house does not have more than ten occupants, there seems to be no reason for continuously stirring up the air in violent motion which does not have any beneficial effect on body heat radiation. It seems unnecessary to arbitrarily design for air changes just to clean the air in the house or to provide ventilation when by all ventilation laws one air change or certainly two per hour is more than adequate in a house.

We were pleasantly surprised not so long ago to have one of the research professors make the statement that after several years of deliberation he had about arrived at the conclusion that a high register air temperature and not more than one air change per hour will provide most comfort possible. Obviously he has some reservations and these are that the warm air must be introduced in such a way that it will "float" up or down over the cold windows and walls, and returns must be so located that there is no cold air draft across the floor, and the register air velocity must be spread by deflectors or otherwise controlled so that high temperature air will not strike the occupants.

This professor is only one of a half dozen good engineers who by one process or another seem to be arriving at the same conclusions. Therefore, your conjectures are not too far out of line and it may be that the industry will some day get together and propose systems which today are looked upon unfavorably.

Balancing Oil-Fired, A. C. Jobs

American Artisan:

Will you tell us exactly how you go about balancing an oil-fired, air conditioning job? We have an anemometer and register thermometers. We also know the cfm for the blower. Books we have on the subject do not give a concise answer.

I. M. B., Washington.

Reply by The Editors

We are attaching tear sheets of 2 articles on balancing published in the April, 1940, issue of AMERICAN ARTISAN. Both of these authors (Landau, page 54 and Fuller, page 57) are practical engineers and have established their methods under actual field conditions.

When we check a job for balance for the purpose of reporting the installation in AMERICAN ARTISAN, we follow a procedure which we think is fairly simple and easy. First of all, we obtain a copy of the data sheet showing the heat loss and the CFM at the selected register temperature for each room. We then roughly estimate the actual register air temperature based upon ¼ to ½° drop per foot of duct (actual length), and check this register temperature against the design register temperature. We then open all branch dampers full open and set the thermostat high enough to run the firing device or call for heating. We hang a thermometer in each room from small stands, similar to those used by Landau. We place these thermometers in the approximate center of the room and at about shoulder level.

We balance jobs to room temperature and not CFM, since room temperature after all is the criterion of comfort regardless of how much air volume is needed or specified. We permit the firing device and fan to operate for a few minutes, or long enough to bring the fan and heat output to a rough balance. We then check the register air delivery by making at least 6 traverses of the face. We include as one traverse at least 3 spots along the lower ⅓ of the register since we all know that usually the lower ⅓ doees not deliver much if any air, and this usually decreases the total air delivery from the register.

We check each register air delivery against the specified air delivery and we roughly balance the air delivery by opening and shutting dampers in the branches. We then check each room thermometer and set the dampers wider for rooms requiring more heat and closed for rooms which come up to temperature quickly. Two men make a good crew, one to read the anemometers and the thermometers and the other to set the dampers in the basement according to a prearranged signal through the duct work.

Association Activities

Chicago

The Furnace, Air Conditioning, Sheet Metal Institute met at Rhineland's Hall, 3159 Southport Avenue, on June 12 and listened to reports on important subjects discussed at the National Warm Air Heating & Air Conditioning Association's June meeting.

The latest developments on the proposed Illinois state furnace law were reported.

Louis Drehobl, President

◆

New York Merchandisers

The Merchandisers Association, auxiliary to the New York State Sheet Metal, Roofing and Air Conditioning Contractors' Association, Inc., announces their second annual mid-summer meeting and outing at Drumlins Golf and Country Club, Syracuse, on Thursday, July 24th.

The announcement invites members to pass the word along to contractor friends, extending them a pressing invitation to be on hand. Golf and Horseshoe Pitching are on the program.

Charles Lighthart, Secretary.

◆

Gary, Indiana

The Gary District meeting of the Sheet Metal and Warm Air Heating Contractors' Association of Indiana, was held at Whiting, Indiana, on June 13th. The guest speaker was R. H. Guenther of the Accurate Sheet Metal Works of Chicago. Thirty-five members were present from the cities of Whiting, Gary, Chicago, Hammond, South Chicago and other towns in the district.

President Elmer Mullin, Secretary Homer Selch, and A. A. Nemec of the Indiana Fur-Mets were present from Indianapolis.

A committee of three—Hildebrand Heating & Ventilating, Freiberger Sheet Metal, and C. C. Sieb—were present from Fort Wayne and invited all sheet metal and warm air heating contractors to attend the next District meeting, to be held in Fort Wayne on August 29.

Homer Selch, Secretary.

◆

Chicago—South Side

The Associated Air Conditioning & Sheet Metal Contractors met at their hall—11145 S. Michigan Avenue, Chicago—on May 26. The meeting was called to order at 9:15 by President H. M. Daily. The roll call of officers showed John Van der Steig, John Knolls, George Witt, and Otto Kruger absent, with all others present. The minutes of the last meeting were approved.

A communication from Secretary Kirby of the Central Committee was received and the secretary ordered to answer all questions.

A motion made by Louis Bohlen, seconded by C. Beston, that we hold no meetings until September 24, carried, whereupon the secretary was ordered to notify the landlord, enclosing check for rent for the three months, with provision that we receive credit for any rent they may get by renting the hall on meeting nights.

D. C. Ellison made a few brief remarks, after which E. C. Carter of Snips reviewed conditions as to Bill 152 in the State Legislature, up for third reading.

Louis W. Reining of Thermo-Drip and Cook Controls gave a splendid talk and demonstration of the new Fluid Power furnace control—a 1941 model—and explained other features of the new design Cook controls.

A. R. Harris, Secretary.

Florida

The Florida Roofer of June 15, published by The Roofing & Sheet Metal Contractors Association of Florida, carried a picture of their annual banquet at the Roosevelt Hotel, Jacksonville, on April 19.

Frank Tack, Chairman of the Legislative Committee, attended a hearing of Workmen's Compensation rates at Tallahassee on May 12th. Code rate No. 5551 for roofing has been reduced from $6.79 to $6.00. Code rate No. 5538 for sheet metal has been increased from $2.01 to $2.17. The increase in the sheet metal rate is due to many small accidents which are worse than one large one costing the same amount in claims as it makes the industry look as though it were a dangerous classification whereas one serious accident might be just a case of hard luck or fate. Frank says, "We should warn our men about these small accidents and urge more care."

Bill Palmer, in Miami, was fretting because a state license inspector was threatening to send him to jail unless he bought license plates for his tar pot trailers. Frank Tack went to headquarters at Tallahassee and received assurance from Henry Driggers, License Tag Commissioner, that no plates would be required. The ruling given states that when the tar pot is mounted on a trailer and the trailer is used for that specific purpose then only the pulling vehicle is required to have the license plate.

E. H. Hale announces that he has bought out the Reliable Roofing and Sheet Metal Co. of Fort Pierce and is operating under the name of E. H. Hale Roofing and Sheet Metal Works at 314 Orange Ave. Mr. Hale sold his business in Melbourne to Brevard Roofing and Sheet Metal Works.

H. R. Bohnert of Miami interrupted a very important fishing trip last month to sign up a contract for 1,700 squares of asbestos shingles.

We are sorry to learn that Abe Kohn of Miami is now laid up with a broken vertebra.

The secretary calls attention to the savings made in the cost of license plates by the association and asks members to send their $5 annual dues.

L. A. Burgess, Secy.-Treas.

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Milwaukee

The Sheet Metal Contractors Association of Wisconsin, Inc., announces their annual picnic to be held on Wednesday, July 23, at Mequon Tavern Park at Mequon, Wisconsin (Highway 57 North) and invites all to attend.

The Committee is actively engaged in making the arrangements.

The Committee is also planning a boat cruise on Lake Michigan on the new million dollar S. S. Milwaukee Clipper later in the season. This is an eleven-hour cruise across Lake Michigan and return—Milwaukee-Muskegon.

Paul L. Biersach, Secretary.

◆

Fox Valley, Illinois

The regular monthly meeting of the Fox Valley Sheet Metal & Furnace Contractors' Association was held on June 16 at Bobbit's Cafeteria, Aurora, with Cafeterial style dinner at 6:30 p. m. followed by a business meeting at 7:30.

Ray Lorenz of the Chicago Furnace Supply Company gave a talk and demonstration on the fabrication of ducts for forced air heating.

A committee was appointed for the Annual Field Day, to be held July 16.

Fred R. Lamp, Secretary.

(*Continued on page* 98)

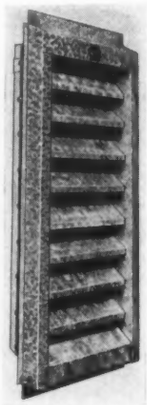
New Products

For your convenience a number has been assigned each item. Circle the items in which you are interested on the coupon on page 92 and mail to us.

● Indicates product not listed in 1941 Directory.
△ Indicates manufacturer not listed in 1941 Directory.

● 112—Attic Ventilator

The Majestic Company, Huntington, Ind., announces a new metal attic ventilator of riveted construction, and with sloping seamless top which drains all moisture to the outside.



The ventilator is offered in two designs —for flush or recess instalation — and in three standard sizes in each design. They are built of heavily galvanized steel. A 16-mesh galvanized screen is secured to the back of the ventilator. The screen may be removed and replaced with a metal panel to close the ventilator.

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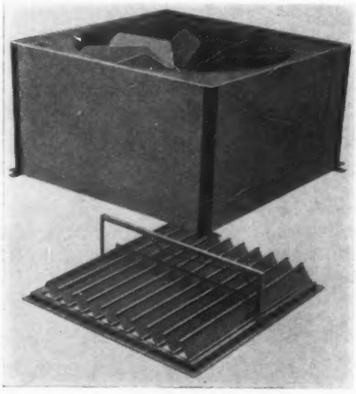
113—Coolair Attic Packages

American Coolair Corporation, Jacksonville, Fla., announces the V and VT series attic packages.

The units include Coolair's new improved Type O or OT (twin) fan,



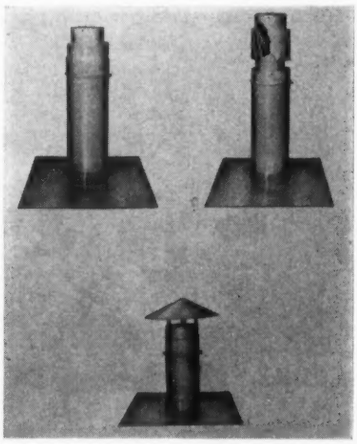
sturdy plywood suction box with reinforced metal corners and the recently developed Coolair automatic ceiling shutter. All moving parts of the fan are suspended on patented sound-absorbing springs. Specifications include ball bearings in fan hub, ball-bearing motor, welded steel frame and eight steel blades, all-steel ceiling shutter with overlapping flanged edges of shutter vanes, fusible link to comply with underwriters' requirements and adjustable tension spring.

The package is available in three single and three twin sizes. Capacities range from 8,000 to 20,000 cfm.

114—Vitroliner Chimneys

Condensation Engineering Corporation, 2515 S. Archer Ave., Chicago, offers Vitroliner in a new use—a complete outlet or vent pipe for residential and small commercial space and water heating installations.

Vitroliner Vent Pipe consists of sections of vitreous enameled pipe and fittings insulated with a high-temperature, prefabricated asbestos wall one inch thick. The outer sur-



face is coated with refractory cement. The cylindrical tube insulation is held together with metal bands. Vitroliner has the approval of the National Board of Fire Underwriters where gas is the fuel, for installation inside partitions and walls. Their only requirement is a one-inch clearance from combustible materials.

Vitroliner is fabricated from Armco Ingot Iron and porcelain enameled by the Ingram-Richardson Company, Frankfort, Indiana, and distributed by Condensation Engineering Corp.

◆

115—Humidair

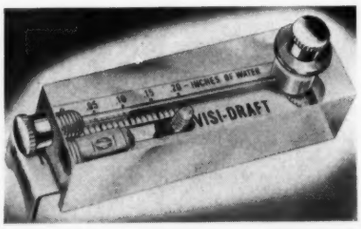
Skilbeck Mfg. Co., 7432 27th Ave., Kenosha, Wisconsin, offers "Humidair" humidifiers with more than 700

square inches of evaporating surface that hangs vertically inside the furnace jacket. The evaporating plate is fed from the top, and is in the direct path of the air travel.

116—Visi-Draft

F. W. Dwyer Mfg. Co., 565 W. Washington Blvd., Chicago, offers the Visi-Draft draft gauge, a low-priced instrument.

The scale is graduated in .01 inch divisions. All bores are drilled and reamed in a solid block of crystal



clear plastic. The leveling bubble is set in a polished bore on the body of the gage, protected and visible from all angles. Level and zero scale adjustments are made simultaneously. A tapered connector is furnished with fittings adapted for pressure, vacuum or differential readings.

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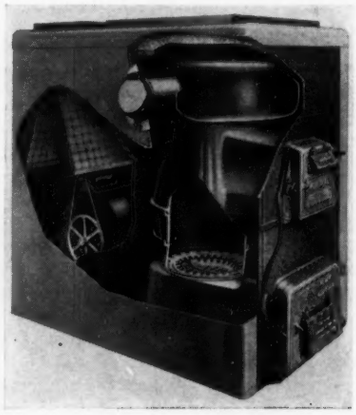
117—Aristocrat Conditioner

The Henry Furnace and Foundry Company, of 3473 E. 49th St., Cleveland, has recently placed on the market a newly designed Aristocrat coal-fired winter air conditioner with cast heating element. Improved features



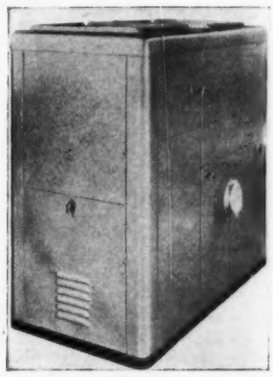
include the large heating capacity in a more compact unit and modernly styled cabinet with metal floor which makes it an air-tight dust-proof heating chamber. Quiet running blower available in extra large area to circulating air. Thermo-Drip or Automatic June humidifiers. Extra heavy heating element eliminates all but four joints inside cabinet. Automatic controls govern all operations.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 92.

118—Oil-Fired Conditioner

Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., announces a new oil-fired air conditioning unit—60 inches high, 32 inches wide and 61 inches deep. The drum and radiator are arc welded into one piece.



The unit is complete with automatic burner and controls and has a heating surface of 6200 square inches. Operated by a 1/6 hp motor driving a 12-inch blower, it will heat, clean, humidify and circulate 1200 cu. ft. of air per minute.

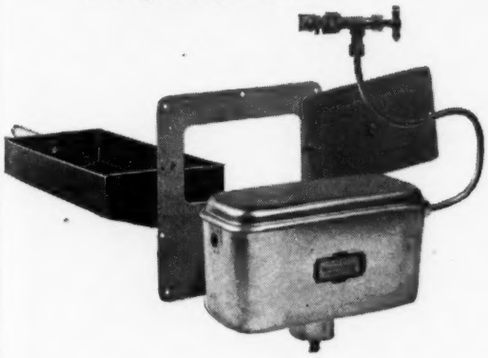
Heat is provided by a pressure type burner approved by the Underwriters Laboratories. No. 2 or 3 domestic fuel oil is used. Access to the combustion chamber for flame observation is provided by a door through which heater coils to supply hot water may be inserted.

◆

119—Humidifier

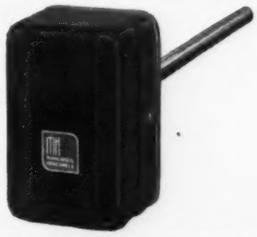
Badger Mfg. & Sales Co., 743 N. Fourth St., Milwaukee, announces the Badger automatic humidifier, sized to fit all furnaces.

The float chamber is made in one piece, the evaporating pan is vitreous enameled and has "V" bottom to lessen air resistance. A snap-action self cleaning valve controls the water supply. Evaporator plates and rack are available for forced air furnaces—the amount of evaporation may be varied by increasing or reducing the number of evaporating inserts.



120—Insertion Type Thermostats

Minneapolis-Honeywell Regulator Company, 2726 Fourth Avenue South, Minneapolis, has available two new temperature controllers—the Master and Submaster insertion-type thermostats. Their function, primarily, is to control air conditioning equipment so that the summer indoor temperature



of a building is changed automatically as the outdoor temperature changes.

The Submaster thermostat may be used to operate valves or dampers to control the temperature of air or liquids while the Master thermostat, measuring the temperature of some other medium such as outdoor air, automatically resets the control point of the Submaster thermostat as the outdoor temperature changes.

Both controllers have a scale range of 20 to 120 deg. F.

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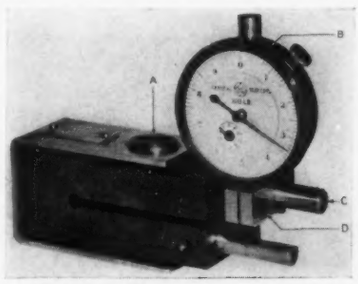
● 121—Electrode Pressure Gage

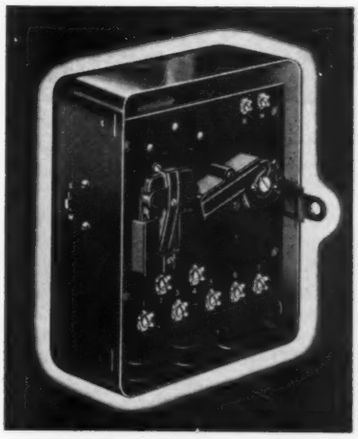
General Electric Co., Schenectady, N. Y., announces an electrode pressure gage designed to measure the pressure between the electrodes of resistance-welding machines, for use either as a standard for checking existing gages or pressure indicators on spot,



line, or projection welders, or for checking the electrode pressure at the time of set-up, before proceeding with production work.

The gage may also be used by testing laboratories for pressure determinations.

Consisting of a calibrated steel yoke and a micrometer dial indicator, the gage is easily applicable to existing resistance welding machines without the need for jigs or other auxiliary equipment. The dial indicator is direct reading.



122—3-Control System

Penn Electric Switch Co., Goshen, Indiana, announces the new Type 561SW air conditioning stoker relay which provides hold-fire operation of the stoker as well as simultaneous fan and stoker operation at the command of the room thermostat. Fan or blower operation is unaffected during a hold-fire operating period.

A summer-winter selector switch on the side of the control case can be switched to "summer" position, when the relay unit will provide summer fan operation for air circulation, when the house temperature goes above the setting of the same room thermostat.

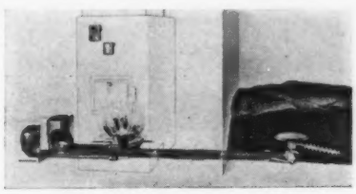
The only other controls required in the system are the Type 870 internally heat actuated thermostat, which is a low voltage room thermostat, and a Type 515AT04D combination fan, limit and relief fan control. This latter unit provides for all bonnet switch functions in one unit.

Automatic day-nite control for lowered night temperature may be included in the system by the addition of the Type 772 Tem-Clock.

◆

123—Ash Removing Stoker

Pocahontas Fuel Company Incorporated, 1190 E. 152nd St., Cleveland, offers the "Original Pocahontas" coal burner which collects the coal in the coal bin, feeds it to the fire, burns it smokelessly and efficiently, and then removes the ashes, storing them automatically in a sealed container.



This small bin-feed ash-removal coal burner (Model D) fits into the average small home.

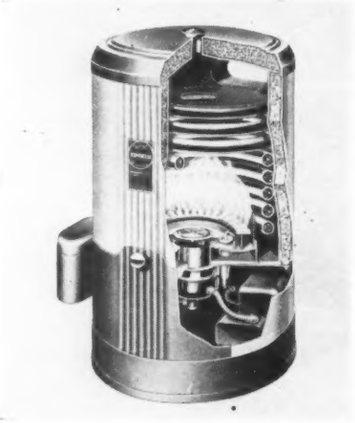
An extended worm rotates under the coal pile, conveying it to the feed worm which carries it to the fire. The rotating worm is urged ahead by a "differential action" around its circular path. Sloping sides to the coal bin are unnecessary.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 92.

• 124—Oil Fired Water Heater

The Timken Silent Automatic Division of The Timken-Detroit Axle Company announces a new oil-burning water heater. Model 30-E has a capacity of 30 gallons per hour heated through a 100 degree rise in temperature. The Model 30-E enlarges the line to include capacities from 30 to 65 gallons per hour.



The Model 30-E is a coil type heater designed for use with separate storage tank up to 90 gallons capacity. Water is heated by a Timken Wall-Flame oil burner in a 24-foot coil of 1 inch copper tubing.

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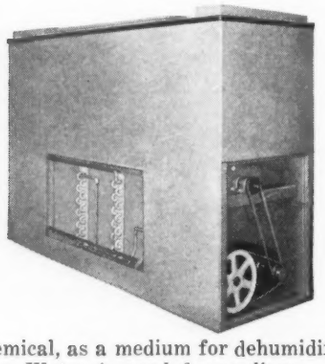
• 125—Calorider

The General Air Conditioning Corporation, Appleton St., Cincinnati, announces the Calorider, designed to dehumidify, filter and cool air for summer operation and to humidify air for winter use, at low operating cost. The Calorider uses "Caloride", a patented form of moisture-absorbing chemical, as a medium for dehumidifying. Water is used for cooling.



The Calorider removes odors, dust and pollen from the air. The unit will deliver up to 1500 cfm, and is encased in an all-metal cabinet, 54 x 90 x 30 in. wide.

Humidity is obtained by circulating hot water through the coils and spraying from the reservoir.

126—Hold-Down Device

Beverly Shear Company, 3004 W. 111th Street, Chicago, has re-designed and now features an exclusive ball-bearing hold-down device for the heavy duty shear. This improvement greatly increases the stability of the unit in acting as a guide when metal is passing over the table of the shear. With the new invention, metal can be turned in any direction to make any shaped cut. The ball joint of the hold-down offers no resistance in turning the metal and makes possible cutting without the danger of marring. The improved Beverly B-3 is efficient in cutting $\frac{3}{16}$ ga. mild steel and 10 ga. stainless.

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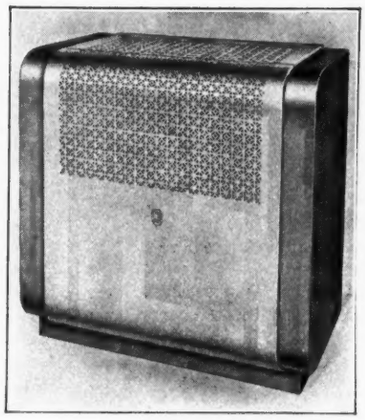
127—Gas Valve

Perfex Corporation, 500 W. Oklahoma Ave., Milwaukee, has recently developed the Thermo-Draulic gas valve. Controlled by a room thermostat or other device, this instrument regulates gas flow to the burner.

The valve disc is opened by an expanding liquid in the thermo-draulic element. In case of power-fail ure, broken wire or possible damage to the thermo-draulic element, the valve will return to the closed position.



128—Silent Sioux Console

Silent Sioux Oil Burner Corp., Orange City, Iowa, offers a new console type heater—a 20th anniversary special, a combination radiating and circulating oil-burning circulator.

The heater is equipped with two round drum-type heat transfer units, the one enclosing the Triplex Junior burner, serviced through the top of the unit. The second drum, acts as a radiator or economizer. A six-inch stack connection from the lower end of the second unit traps the heat, thereby reducing stack loss. The new design is finished in two shades of brown hammertone, smooth finish. Btu output per hour is 37,000.

A 3-gallon removable tank with barometric feed is equipped with oil gauge.

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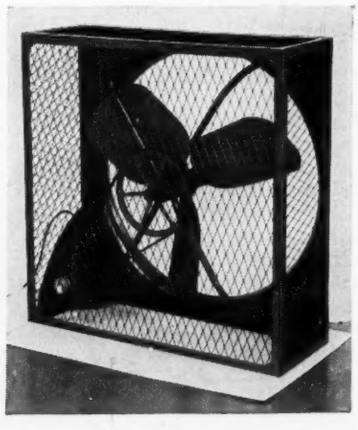
129—Niteair Comfort Units

The Lau Blower Company, 2001 Home Ave., Dayton, Ohio, announces Niteair attic fans available with front and rear guards for installation with safety in storerooms, factories, stores, restaurants, etc. There is considerable free area in the guard grilles.



Model 3041 produces 7500 cfm and is powered by a ¼ hp motor.

Model 4871, the largest unit, produces 20,000 cfm and is powered by a ¾ hp motor. There are four intermediate sizes made to deliver 10,000, 12,000, 14,000 and 17,000 cfm respectively.

That was YOU!... Remember?

THE KID was standing on a street corner, in the rain. The crummy curled-up felt hat —left in the mess hall by the oldtimer who swiped the kid's new issue headpiece—was too small, let the rain trickle down his neck. The OD blouse had a size 16 collar that sagged in front. The rough field shoes would have fitted two other fellows. He looked more like a scarecrow than a soldier, and felt funnier.

It was his second month in the Army, and his second camp. In the shift, his service record hadn't arrived in time for payday, and a lone two-bits stood between him and the next. Main Street was lined with movie houses, dance halls, eat joints and banana-split dispensaries—all strictly no good to a soldier shy of folding money ... He had come into town because he was fed up with the barracks; but even bunk fatigue was better than roaming around by yourself in the rain in a strange town... He wondered when the first truck would start back to camp...

THE kid soldier was YOU... remember? You've probably forgotten. Looking back, those were the best days of your life—but not all of them, if your memory tells the truth! Some of them were pretty sour, particularly at first. Later, you learned about the "Y" huts and service clubs where you could spend time when you hadn't anything else to spend. They tossed teas, and held dances, and you met some local girls and got invites to Sunday dinners, and felt like a human being once more!

Now we have another citizen army, mostly kids like we were. Sure, the Army dresses them better, and feeds them better than it did us. But these boys get homesick and lonesome, fed up with formation and drill and routine, just as we did. They have the same old problem with their spare time—and twenty-one bucks a month doesn't solve it... That's where the USO comes in.

THE USO—United Service Organizations for National Defense—are all the old welfare outfits working under one big tent today. (See the list below.) Outside of camps and in nearby towns, they set up recreation centers for service men, and defense workers; places where the boys can loaf and play when off duty. They help out with problems, give directions and advice, arrange entertainments; may even put the boys up for the night or on weekends when they are out on passes. And they do a good job, as they always have!

The USO figure they will have to take care of 2,000,000 customers in the next year—men in the armed services, men and girls away from home on defense jobs. And they need $10,765,000—a little over $5 per person served... It isn't much to ask for. And where can a 5-spot buy more than in the USO?... Send your contribution to United Service Organizations, National Headquarters, Empire State Building, New York, N. Y., or to your local USO Committee. Join the army behind the Army! Thanks...

Give to the U.S.O.!

The Young Men's Christian Association • The National Catholic Community Service • The Salvation Army • The Young Women's Christian Association The Jewish Welfare Board • The National Travelers Aid Association

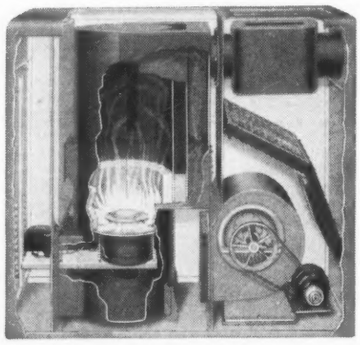
New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 92.

130—Gilco Oil Furnaces

J. L. Gillen Company, Dowagiac, Mich., is offering a new line of Gilco furnaces for the average home with 65,000, 85,000 and 100,000 Btu output at the register.

Features include an oil-flow meter, burner fan, Gilco vaporizing power

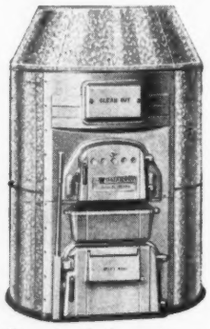


burner, refractory lining, combustion chamber of heavy boiler plate steel welded, radiator of heavy boiler plate steel, and inner liner of 20-gauge steel, filters and blower.

The outer casing is finished in aluminum gray Hammerloid enamel.

131—Re-Designed Standard

The Williamson Heater Company, 337 West 5th St., Cincinnati, has completely re-designed the front castings

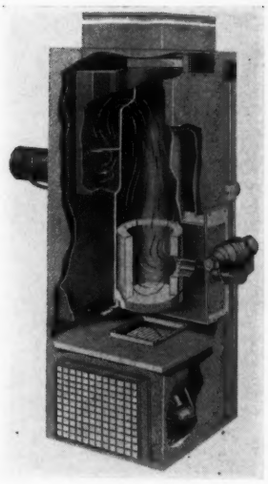


of their Standard furnace making it modern in appearance.

The new Williamson Standard has one-piece radiator, two-piece firepots, duplex grates and a one-piece cast base ring. Six sizes are available, ranging from 18 to 28 inches.

• 132—60-BD Conditioner

Round Oak Company, Dowagiac, Michigan, has designed and built especially for the small, moderate-price homes where minimum space is avail-



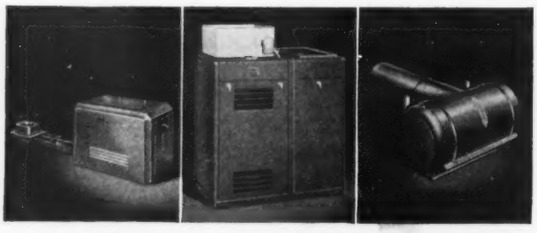
able, the 60-BD automatic oil heat winter air conditioner.

This vertical unit heats, humidifies, filters and circulates the air. Cabinet is 26 x 26 x 70 inches high. The illustration shows pre-cast combustion chamber combined with pressure-atomizing oil burner; also compact assembly of jointless steel drum and radiator. Baffled radiator is used to extract heat from combustion gases. Btu rating at bonnet is 62,280.

Centrifugal type blower is located at the bottom of the unit. New type humidifier is automatically controlled by Snap-Action valve. Complete unit is cased in blue Hammerloid cabinet.

It's Ready . . . **The "MINUTE MAN"**

With the new "MINUTE MAN" in its line-up, Conco provides for complete coverage of the oil-fired air-conditioning market. The Conco Major Series has already established itself in the medium and large sized homes. Now the Conco MINUTE MAN comes forward to claim the small home market for Conco dealers. The whole line — including the Conversion Oil Burners — is finished in green hammerloid; is shipped completely assembled and ready for installation. In 1941, too, Conco offers a new stoker series and a new series of gas-fired airconditioners and gravity warm air furnaces. Write today and "Get the facts on Conco first."



Conco Clipper — Low-Cost Stoker | Conco Gas-Fired Airconditioners | Conco Conversion Oil Burners

- GAS-FIRED AIRCONDITIONERS
- BLOWERS
- OIL-FIRED AIRCONDITIONERS
- DOMESTIC STOKERS
- COMMERCIAL STOKERS
- COAL-FIRED FURNACES
- GAS-FIRED FURNACES
- HOT WATER HEATERS

CONCO CORPORATION

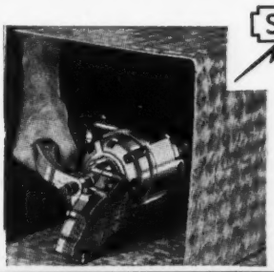
70 EUCLID AVE., MENDOTA, ILL.

Fastest Method of Cutting Sheet Metal

STANLEY
"Mighty Midget" UNISHEAR

Slices through sheet materials fast as you feed up to 15 feet a minute. Weighs only 7½ pounds, yet will cut any metal up to 18 gauge hot rolled steel easily and quickly.

The Stanley "Mighty Midget" Unishear cuts the most intricate shapes—follows any line—straight, curves, angles or notches—with hairline accuracy. No waste metal. Leaves smooth, finished edges without distortion. Universal type motor can be plugged into ordinary light socket. Men who've used the "Mighty Midget" for years call it the fastest cutting, easiest handling metal cutting tool. There are two other portable models and seven stationary models with capacity up to 10 gauge.



TRADE STANLEY MARK

PIVOTED DUPLEX HANDLE

Exclusive with Stanley, the pivoted duplex handle gives you *two* convenient grips to make handling easy in any position. Handle swings to side for nosing into restricted spaces. Simple as flexing your wrist.

Ask your Stanley distributor for a demonstration on your own work, or write us for literature. Stanley Electric Tool Division. The Stanley Works, 131 Elm St., New Britain, Conn.

STANLEY UNISHEARS THE ELECTRICALLY DRIVEN HAND SHEARS

SKUTTLE'S *NEW* 300-A AUTOMATIC HUMIDIFIER

AVAILABLE IN 18″, 20″, 24″, 30″ PAN LENGTHS

Features

- New Style collar. Adjustable for use on sloping or vertical bonnets.
- Large inspection door makes the evaporating pan easily accessible for cleaning. Inspection door may be mounted in any convenient position, in front, at the side or in the back of the plenum.
- Evaporating pan is completely inside the furnace bonnet.
- New rear support. Adjustable to fit various furnace sizes and tight fitting to prevent leakage. Neater appearance. Rear support also fits sloping bonnets.
- Anti-siphoning valve, standard equipment, at no extra cost.

Construction

Each part selected for long life.

- Tank and Valve assembly—pure copper and brass.
- Evaporating pan — Vitreous enameled for long life.

ORDER YOUR UNIT TODAY, IT WILL PROVE A REAL PROFIT MAKER

SKUTTLE *Sales* COMPANY

Air-Conditioning Equipment

1015 FRANKLIN ST. • • • DETROIT, MICHIGAN

CAN A FURNACE HAVE A BRAIN?

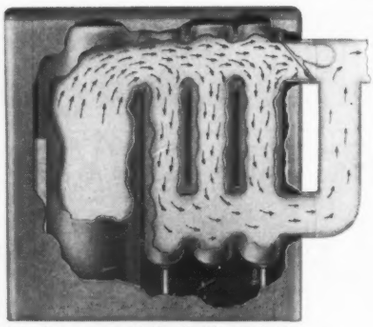
You Will Wonder When You Install

PATENTED AUTOMATIC DAMPER
15 Years Service Without Replacement Is An Average Record

THE LEADER KOOLSTACK

and see stack temperatures positively controlled and heating surfaces automatically adjusted to the fuel consumed.

THE ARROWS TELL THE STORY



Note hot gases contacting heating surfaces. That's why the stack is cool.

IT PUTS NEW SALES BLOOD IN THE HEATING BUSINESS

The Koolstack line of warm air furnaces is complete. Furnished in square cabinet or round cased types. The Koolstack gives the heating trade

"SOMETHING TO SELL"

Because no other furnace can have its patented features.

ENGINEERED FOR
OIL BURNER
STOKERS
HAND FIRED

You Can Pull Your Business Out of the Competitive Class with

THE KOOLSTACK

Write Today.

Round Cased for New or Replacement Jobs

LEADER IRON WORKS, INC.
2841 N. JASPER ST. DECATUR, ILLINOIS

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on page 92.

182—Twin Contract Controls Handbook

Perfex Corporation, Milwaukee, Wisconsin, announces the 1941 issue of the Twin Contact controls handbook. This publication includes control and installation material for oil, stoker or gas fired automatic heating systems—each published in a separate Handbook, or bound in any combination of the three.

Each book has three main sections—(1) the catalog section illustrating, listing and describing all types of automatic domestic heating controls—(2) the wiring diagram section showing the controls to use with the various types of conventional heating systems—(3) engineering and service section, giving complete and detailed information on the installation, adjustment, checking and calibration of Twin Contact controls.

These books are imprinted with the trade name, company name and address of burner manufacturers using Twin Contact controls on their units. The different sections of the book are identified by the various colors of paper stock used. This publication is a practical text book on automatic domestic heating controls.

◆

183—A Sketchbook of Attic Ventilation

Viking Air Conditioning Corporation, 9500 Richmond Ave., S. E., Cleveland, has prepared "A Sketchbook of Attic Ventilation" to help dealers to understand how to go about making installations and how to quote an installed price. The sketches given have been planned to enable dealers to work out most installation problems without difficulty. Attic ventilation or night air cooling is explained as cool air flowing through the house to remove the stored heat during the day. Cooling is produced, not by sucking the hot air out, but by drawing the cool air in. Sketches range from the simplest installation to hotel, apartment house, and commercial ventilation.

Included are simple rules of fan cooling—air change, fan cfm required, intake and discharge area, and suggestions for better ventilation through needed spaces.

◆

184—Rollaire Oil Furnace

The Hipoint Corporation, Bellefontaine, Ohio, is distributing a 4-page folder covering the Rollaire oil furnace, in four sizes—85,000, 115,000, 140,000 and 170,000 Btu at the register, burning No. 3 fuel oil. Oil furnace specifications are included.

The Rollaire is an air conditioning furnace, complete with oil burner, drip-type humidifier, blower, filters, limit control, blower control, protectorelay, and barometric chimney draft control.

◆

185—Pipe, Duct and Fittings Cat. 41-C

L. J. Mueller Furnace Company, 2005 W. Oklahoma Ave., Milwaukee, announces their new catalog No. 41-C of furnace pipe, duct and fittings—62 pages—including double and single tin gravity fittings, galvanized iron gravity fittings, pre-fabricated forced air fittings, and specialties. The catalog is spirally bound with each section printed on a different colored stock. There is a brief index on the cover, with a complete index on page 60.

◆

186—Net Price and Estimating Book

Rock Island Register Co., 2435 Fifth Avenue, Rock Island, Illinois, is distributing their new price and estimating book dated June 15, 1941, with complete index on the inside front cover.

The various registers and faces are pictured, followed by specifications and prices. Some pages are devoted to square and round pipe and fittings. Codes and other data are given.

SURVIVAL OF THE FLEETEST

ALTER EGO: Literally, "one's other self"—the still, small voice that questions, inspires and corrects our conscious action.

YOUR ALTER EGO: Look how simple and how quickly we can repair and build by arc welding.

YOU: *Yes, but why should we tackle a new way when we've had so much EXPERIENCE with the present way?*

YOUR ALTER EGO: Don't let's kid ourselves, that's NOT experience—it's just HABIT and habits (even some good ones) will mow you down if you stick with them long enough.

YOU: *But the methods we're now using were written up as tops when we first started.*

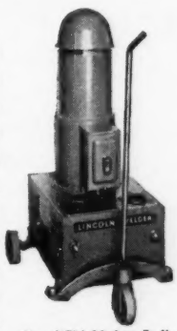
YOUR ALTER EGO: Yes, and that was exactly the same year you paid $3000 for your Peerless auto. Suppose you had kept that car, unused, in a glass case and put it up for sale today—one of the best cars on the American market—do you think you could get $25 for it?

YOU: *Boy! Haven't times changed! Haven't values changed! Just look what better and speedier welding methods have done.*

YOUR ALTER EGO: You really mean that we've got to snap out of costly habits if we hope to survive in the faster era, just ahead. It is survival not only of the fit, but also of the fleetest.

★ ★

LINCOLN SUGGESTS: Now you can get new, profitable lines of business with arc welding—sheet metal products and structures of all kinds as well as maintenance and construction welding for overloaded factories. This will boost your income today and strengthen your position for tough years ahead. The "Shield-Arc Jr.", shown at the right, provides the *exact* arc for every job for easy welding and top quality results. For valuable business-getting pointers, see the latest "Welding Profits," Bul. 119-G.

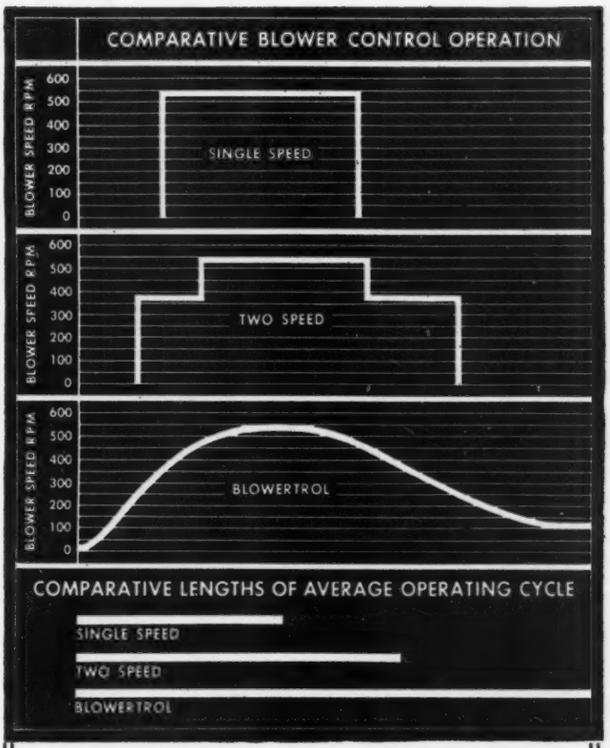


New "Shield-Arc Jr." Welder. "Job Selector" and Current Control assure the exact arc for every job, for faster and better welding.

Copyright 1941, The Lincoln Electric Co.

LINCOLN-SHIELD-ARC-WELDING THE LINCOLN ELECTRIC COMPANY Cleveland, Ohio

Largest Manufacturers of Arc Welding Equipment in the World



WHICH Service

are you giving to your Forced Air Heating Customers?

COMFORT comes first in the customer's opinion of your Forced Air Heating installation. The chart above shows why efficient blower speed control can make such a big difference in the COMFORT of Forced Air Heating. Insure greater Customer Satisfaction by installing with every Forced Air job, the

MASTER BLOWERTROL

Thermostatic **HYDRAULIC CONTROL**

It *gradually* increases and decreases blower speed in direct ratio to the bonnet temperature of heating unit. It does away with chilly blasts, hot blasts, air stratification with its "cold 70" and cold drafts. It eliminates blower starting noise and excessive strain on blower motor.

The MASTER BLOWERTROL is automatic in operation, simple in design, carefully constructed, *dependable!* Moderate in cost and adaptable to any forced-air heating system, new or old, using a centrifugal blower, regardless of fuel.

Write for BULLETIN giving full details of construction and operation.

WHITE MANUFACTURING CO.

2360 University Avenue St. Paul, Minnesota

Asbestos Protected

DUX-SULATION

for SOUND ABSORBING AND INSULATING, HEATING, VENTILATING AND AIR CONDITIONING DUCTS

Meets New Needs!

If you, too, are using black iron sheets for duct work, it is all the more important that the ducts be protected with Dux-Sulation to prevent them from rusting. To apply Dux-Sulation the entire duct is coated with a Rubber Base Cement which serves not only as the adhesive for holding the insulating felt in place but as a protective coat for the metal as well.

Has These Superior Features

Dux-Sulation has a 75% insulating efficiency (K factor .27 B.T.U.) . . . High Sound Absorbing efficiency (70%) . . . Low Frictional Resistance . . . Prevents Condensation . . . Will not rot, chip or flake . . . Easiest Insulation to apply and looks best . . . Comes Complete, nothing else to buy . . . Is easy to handle in stock or on the job . . . Each roll contains 100 sq. ft. of standard ½" thickness.

When you have insulated your ducts (either galvanized or black iron) with Dux-Sulation you get the utmost in operating efficiency at a minimum cost. "It pays for itself."

Write office nearest you for details

GRANT WILSON, INC.
4101 West Taylor Street — CHICAGO

PLANT RUBBER & ASBESTOS WORKS
537 Brannan Street — SAN FRANCISCO

AIR CONDITIONING UTILITIES CO.
8 West 40th Street — NEW YORK

ATLAS ASBESTOS CO., LTD.
110 McGill St. — MONTREAL, CANADA

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on this page.

187—Lessons in Arc Welding

The Lincoln Electric Company, 12818 Coit Road, Cleveland, offers "Lessons in Arc Welding"—176 pages, 6x9 in.; with 170 illustrations including photos and drawings. The cover is flexible simulated leather, gold embossed. Price 50c in USA, 75c elsewhere.

"Lessons in Arc Welding" is a series of 60 lessons which present fundamental facts of welding, knowledge of which will enable the welder to utilize the process successfully and economically. Text explanations are graphically supplemented by by-line drawings and photos for ready understanding. A set of questions and answers for each lesson enables the student to check his knowledge.

◆

188—Gas Appliances

The Johnson Gas Appliance Co., Cedar Rapids, Iowa, has just issued a new catalog which pictures and describes their entire line of burners, furnaces, torches, mixers, valves, and blowers. Among the new items shown in the catalog are the Johnson No. 130 Hearth Type furnace; the No. 570 Pot Type Hardening and Melting furnace; No. 34 "Pre-Heating" torch; the No. 305 M W Bunsen burner which can be mounted parallel with the pot, tank or vat; the No. 80 Slot type burner for heating large areas; and the Automatic Air-gas proportioner. Also included is a chart showing correct carburizing and heat-treating temperatures and a heat color chart.

◆

189—Sound Deadener Paint

Thompson & Company, industrial paint makers, P. O. Box 6757, Pittsburgh, has just issued a new descriptive folder on "Tanco," a sound deadener paint for sheet metals. "Tanco" is a new silencer for use on air-ducts and all sheet work and equipment, and is also applied on steel plate construction. Tanco is a semi-paste paint.

◆

Consumer Literature

Cooler Fan Folders—The Emerson Electric Mfg. Company, 1824 Washington Ave., St. Louis, offers a new fan folder (X4077) intended for the consumer, illustrating and describing Emerson-Electric cooler fans. Illustrations of a number of Cooler Fan installations with and without a plenum chamber (suction box) picture this central cooling system in operation. Useful information on the proper selection of fans, and prices are included. Name and address of retailer is imprinted without charge. Coupon No. 190.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

112	113	114	115	116	117	118
119	120	121	122	123	124	125
126	127	128	129	130	131	132
182	183	184	185	186	187	188
189	190					

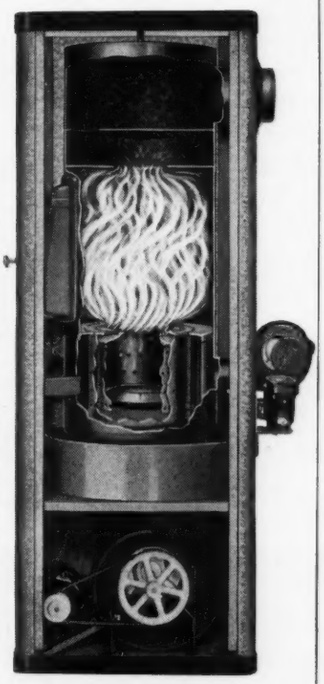
Name .....

Company .....

Address .....

Are you Manufacturer——Jobber——Dealer——

Just the Furnace You Need For Low Cost Installations



Here, Mr. Dealer, is just the automatic unit you need for low cost installations in the smaller low cost or FHA homes. A sure seller because it provides the utmost in complete automatic oil heating service at a lower cost of both installation and operation. Can be installed in the basement or in a utility room on the same floor level as the rest of the home if it doesn't have a basement. Requires very little floor space—a point in favor of the distributor.

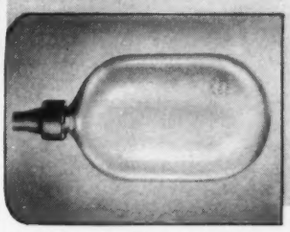
The MONOGRAM Upright Air Conditioner provides 100% automatic full forced warm air heating service in its most economical form, made possible by the high operating efficiency of the exclusive MONOGRAM "Vaporizing" burner. This sensational burner has proven its superiority through actual laboratory tests operating with the highest known efficiency of over 80% as rated in accordance with the standards of the Institute of Cooking and Heating Appliance Manufacturers.

Through proper balance of both primary and secondary air with the vaporized oil this burner actually produces a clean, quiet gas flame made from oil providing the Most Usable Heat from the amount of oil burned. Perfect combustion eliminates all soot or carbon. Only the MONOGRAM "Vaporizing" burner has this exclusive air mixing feature.

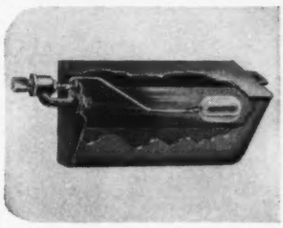
Write today for full particulars on the complete line of MONOGRAM oil burning furnaces. Make your profits with MONOGRAM.

The Quincy Stove Mfg. Company
Quincy - - - - - - - - Illinois

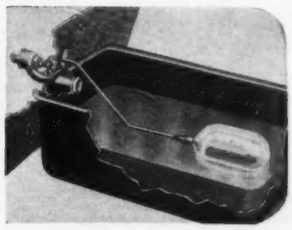
5 Reasons Why You Want M-VB HUMIDIFIER VALVES



This is the Pyrex Glass Float



M-VB's #300 Humidifier Valve



This is the M-VB #305

1 Only M-VB gives you humidifier valves with the important Pyrex glass float! This float licks corrosion troubles once all too common due to mineral content in the water. Pyrex glass floats are tough enough to stand any reasonable handling. They're carefully checked for uniform quality by the manufacturer—and then M-VB gives every one a double check by "light-testing" for uniform strength.

2 M-VB's #300 and #305 humidifier valves have ***outside valve mechanisms***. Everybody knows the extra service life and efficiency that this type of mechanism insures. Despite this added, important feature, M-VB prices are bed-rock for Quality valves.

3 In addition to their other important features #300 and #305 have ***large valve passageways***. This means that water rush and splashing are cut to an absolute minimum—even under relatively high water pressures.

4 It's *easy* to install M-VB humidifier valves *quickly*. The less time it takes to do a job *right* with the *right materials*, the more profit there is in the job for you.

5 All M-VB humidifier valves are built to give long service—and full satisfaction from start to finish. Heavy brass castings—painstaking machining—rigid inspection—these M-VB Quality Points keep the valves on the job and the customers smiling.

When you buy and install humidifier valves by M-VB you get products that are as good as the best, and better than most. If you manufacture—sell—or install warm air furnaces or air conditioning equipment, it'll pay you to specify humidifier valves by M-VB. See your manufacturer or M-VB right now.

M-VB

MORENCY-VAN BUREN DIVISION
SCOVILL MANUFACTURING CO.
Sturgis, Michigan

SCOVILL SAVES YOU TIME IN SELLING—TIME IN INSTALLING

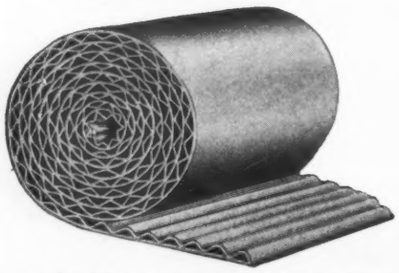
Complete lines of humidifier valves maintained at
Waterville, Connecticut — San Francisco and Los Angeles, California

There Is Profit in Re-Conditioning Heating Plants

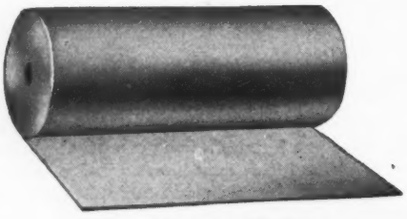
Sal-Mo Asbestos Products

A winter of heavy firing takes a lot out of any heating equipment. Now is the time to show your customers that you can put their Warm Air Heating Plants in shape for another winter of efficient operation by re-insulating and re-conditioning.

See your jobber for a complete line of Salmo Asbestos Products for this purpose—Asbestos and Aircell Papers, Pipe Joint Tape and Asbestos Furnace Cements.



ASBESTOS AIR CELL PAPER



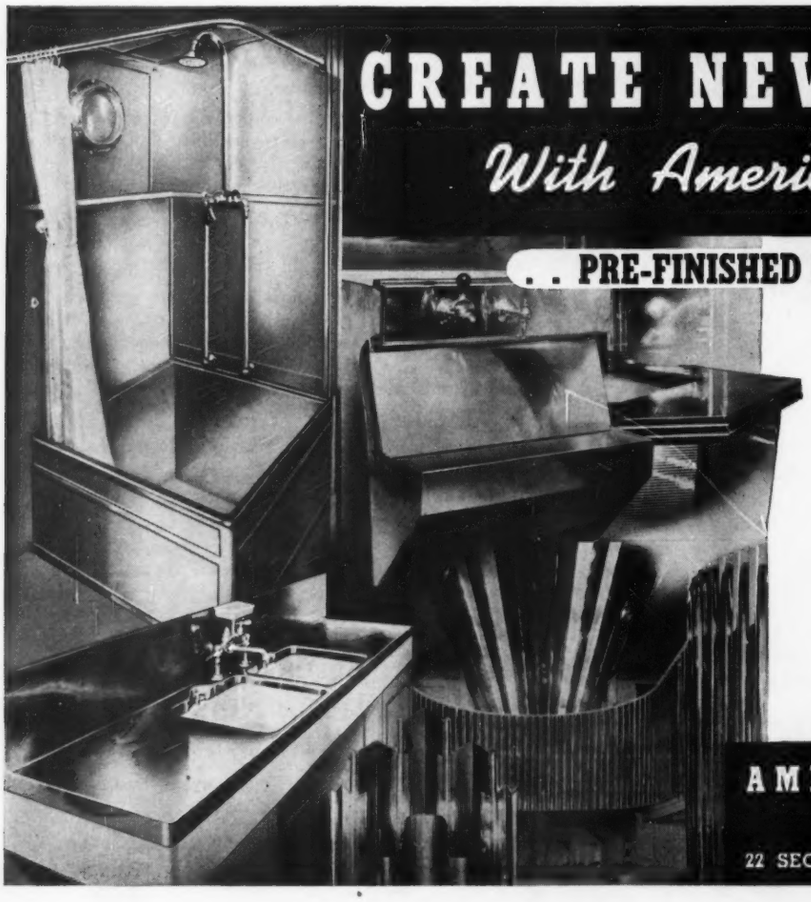
ASBESTOS PAPER

SALL MOUNTAIN COMPANY

176 West Adams Street — Chicago, Illinois

PIPE JOINT TAPE

FURNACE CEMENT



CREATE NEW JOBS . . .

With American Bonded

. . PRE-FINISHED METAL SHEETS AND COILS

Opportunity for a finer, more profitable type of work is yours with these versatile American Bonded Metals . . . available in plain or satin finishes of chrome, nickel, copper, or brass electro-bonded to basic materials of zinc, copper, steel, brass or tinplate. You choose from many striking patterns in sheets, strips cut to order or long continuous coils—in a gauge that adapts the metal to either structural or purely decorative work. For interior decoration, for displays, for structural work American Bonded Metal gives you added prestige. Our metallurgists are glad to have you consult them on any problem. See your jobber or write direct for information.

AMERICAN NICKELOID COMPANY

22 SECOND ST. — PERU, ILLINOIS

With the Manufacturers . . .

H. F. Curtis Becomes Auer Sales Manager

The Auer Register Company, Cleveland, manufacturers of registers and grilles for heating and air conditioning, announces the appointment of Herbert F. Curtis as sales manager. Mr. Curtis has a background of considerable experience in heating lines, and is well and favorably known to the trade.

◆

Viking Plant Destroyed by Fire

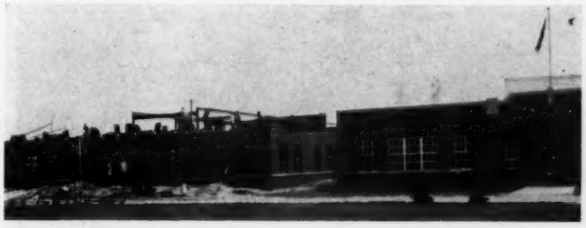
Viking Air Conditioning Corporation, 9500 Richmond Ave., S. E., Cleveland, announces that their factory and warehouse was totally destroyed by fire on Monday, June 23rd. The fire originated in the paint spray booth and rapidly spread through the entire building, which was demolished within an hour. Fortunately, the office building, which adjoined the main factory building, was saved with most of the company records.

A. W. Lehman, Sales Promotion Manager, announces that temporary manufacturing facilities have already been arranged for and limited production is expected within a week or two.

◆

Sampsel Again Enlarges Plant

Sampsel Time Control, Inc., Spring Valley, Illinois, is now completing a new building comprising 24,000 sq. ft. of floor space—a twin to the original Sampsell building



completed last June. The company manufactures a line of stoker and air conditioning controls, damper regulators, thermostats, transformers, relays and limit switches.

◆

Steffner Promoted by Henry Furnace

E. F. Steffner has been advanced to the position of head of the engineering department of the Henry Furnace & Foundry Company of Cleveland, recently vacated by Herbert F. Curtis. "Eddie" is a widely known heating engineer because of his long association with the industry. He came with the company in 1933; and before that was the engineer of the Warm Air Furnace Fan Company.

◆

Herman Nelson Buys Autovent Fan

The Herman Nelson Corporation, Moline, Illinois, announces the purchase on July 1 of the entire assets and business of the Autovent Fan and Blower Company, Chicago. The business will be operated as the Autovent Fan and Blower Division of The Herman Nelson Corporation.

The complete line of Autovent products will continue to be manufactured in the Autovent Division in Chicago. Included are a complete range of sizes of centrifugal blowers from 6 to 72 inches in diameter, in both forwardly and backwardly curved blade designs and a complete selection of propeller exhaust and ventilating fans from 12 to 72 inches in diameter.

INTERNATIONAL PRESENTS

TEN YEAR
Maintenance Agreement

No other furnace can be sold under such an agreement.

You can tell your prospect you will take care of the furnace for ten years without charge—except for smoke pipe repairs or cleaning.

You get paid for any necessary repair work under the Ten Year Maintenance Agreement.

LIKE INSURANCE

Most everyone understands insurance. This agreement is like a full coverage policy. The owner has all necessary repairs without cost, and the term of coverage is ten years—no yearly premium to pay.

EVEN COVERS GRATE BARS

Yes — free replacement of grate bars is included, and with it goes a labor allowance to the dealer for installation.

Think of being able to say to your prospect:

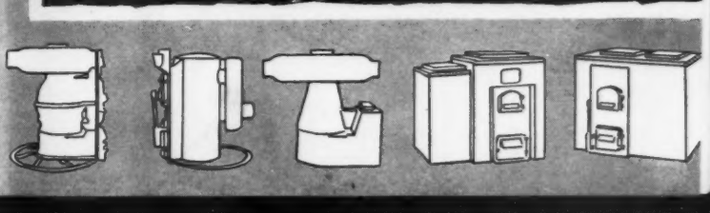
"With this agreement your International Economy Heater will be kept in repair by me for ten years at no charge."

What owner would not avail himself of that protection once it is explained to him. No other furnace is sold under such an agreement.

Write for full information to Dept. A-7, and use this biggest selling help ever offered the heating trade.

INTERNATIONAL HEATER COMPANY
UTICA, N.Y., U.S.A.

WESTERN OFFICE AND WAREHOUSE • 1933 WENTWORTH AVE., CHICAGO, ILL.
NEW ENGLAND OFFICE AND WAREHOUSE • 110 CHESTNUT ST., NASHUA, N. H.
STOCKS CARRIED WITH WHOLESALERS IN ALL PRINCIPAL CITIES



WOMEN "GO FOR" PAYNE'S STRATOLINER DESIGN

Of course, the engineering *inside* the furnace determines its performance . . . but try to interest the ladies in *that* if the cabinet isn't clean-lined, modern and attractive. ☆ That's why – besides PAYNE's famed emphasis on performance – every PAYNE unit also has plenty of eye-appeal. ☆ Penetrating tests in the PAYNE laboratory have proved every detail of design inside and out – from fire travel to baked enamel finish. ☆ When you recommend and sell PAYNEHEAT, your reputation is protected by the Nation's largest exclusive manufacturer of gas heating equipment.

A few territories are open for representation. Address J. H. Keber, Sales Manager. Please mention this advertisement.

Illustrated: PAYNE Sentry Forced Air Unit. Also Floor Furnace, Gravity Furnace, Zoneair Unit, Duplex Furnace, Modern Console, Spacesaver Unit, Industrial Units and Accessories.

PAYNEHEAT

MORE THAN A QUARTER-CENTURY OF SPECIALIZATION

Payne Furnace & Supply Co., Inc., Beverly Hills, California

With the Manufacturers . . .

Revere Award Winners

Nine typical American workmen were notified June 1 that they were the winners in the $10,000 Revere Award for the best contributions made by workers at the bench to America's defense plans, both military and industrial.

Heading the list and winner of the first prize of $5,000 was Eugene Phillips of 1117 Cleckler South, Fort Worth, Texas, creator of a system for the blind landing of airplanes.

The second award of $2,500 went to William R. Holcomb, of 1051 East Providencia Avenue, Burbank, California, for his invention of an electromagnetic riveting gun.

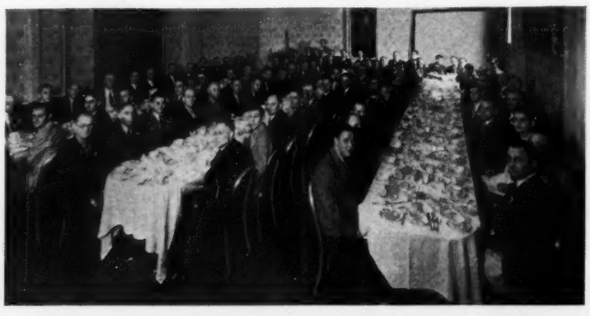
The third prize of $1,000 was awarded to Oscar B. Leibst of 7016 Fifth Avenue, Seattle, Washington, for a structural design eliminating the use of rivets and clips.

◆

Round-Up of Distributors

From Massachusetts to Wyoming—from the Canadian border to the Gulf coast—90 Anchor distributors attended Anchor Stove & Range Company's first round-up, held at the Seelbach Hotel in Louisville, Kentucky, recently.

The purpose of this first distributors' meeting in Anchor's 78 year history was to get acquainted, to inspect the streamlined production methods at Anchor's New Albany, Indiana, plant, and to see the improved line of Anchor Kolstokers.



Highlights of the two day meeting included informative addresses on organization, advertising, and commercial installations, which were given by Clifford M. Lewis, sales manager; domestic and large stoker installations, by F. J. Montgomery, Anchor's chief engineer; new mechanical Anchor features, by Charles H. Brown, superintendent, and J. W. Oeffinger, engineer.

Guest speakers included George T. Badger, Minneapolis-Honeywell Regulator Company, who spoke on Minneapolis-Honeywell controls; C. J. Monroe, of General Electric Company, whose subject was "The G. E. Exchange Plan"; and Allan Butler, of the Perfex Corporation, who explained the Anchor Perfex controls. All distributors had the opportunity of inspecting the Anchor plant.

◆

Manufacturers Successors Buy Patterns

Richmond Radiator Co., Inc., of Uniontown, Pa., announce that due to concentrating their business on air-conditioning and radiation, they have sold their patterns for coal and oil burning boilers to Manufacturers Successors, Inc., 150 Broadway, New York City, who will continue to furnish repair parts for Richmond Boilers.

Manufacturers Successors, Inc., is a new corporation composed of the following well known supply companies:

Associated Heater Parts Corp., Chicago
Heater Repair & Supply Co., Providence
H. C. Oswald Supply Co., Inc., New York City
Stove Manufacturers Corp., Newark
Waverly Heating Supply Co., Boston

FURNACE *Profits* PLAN

A New Way to Build Furnace Business

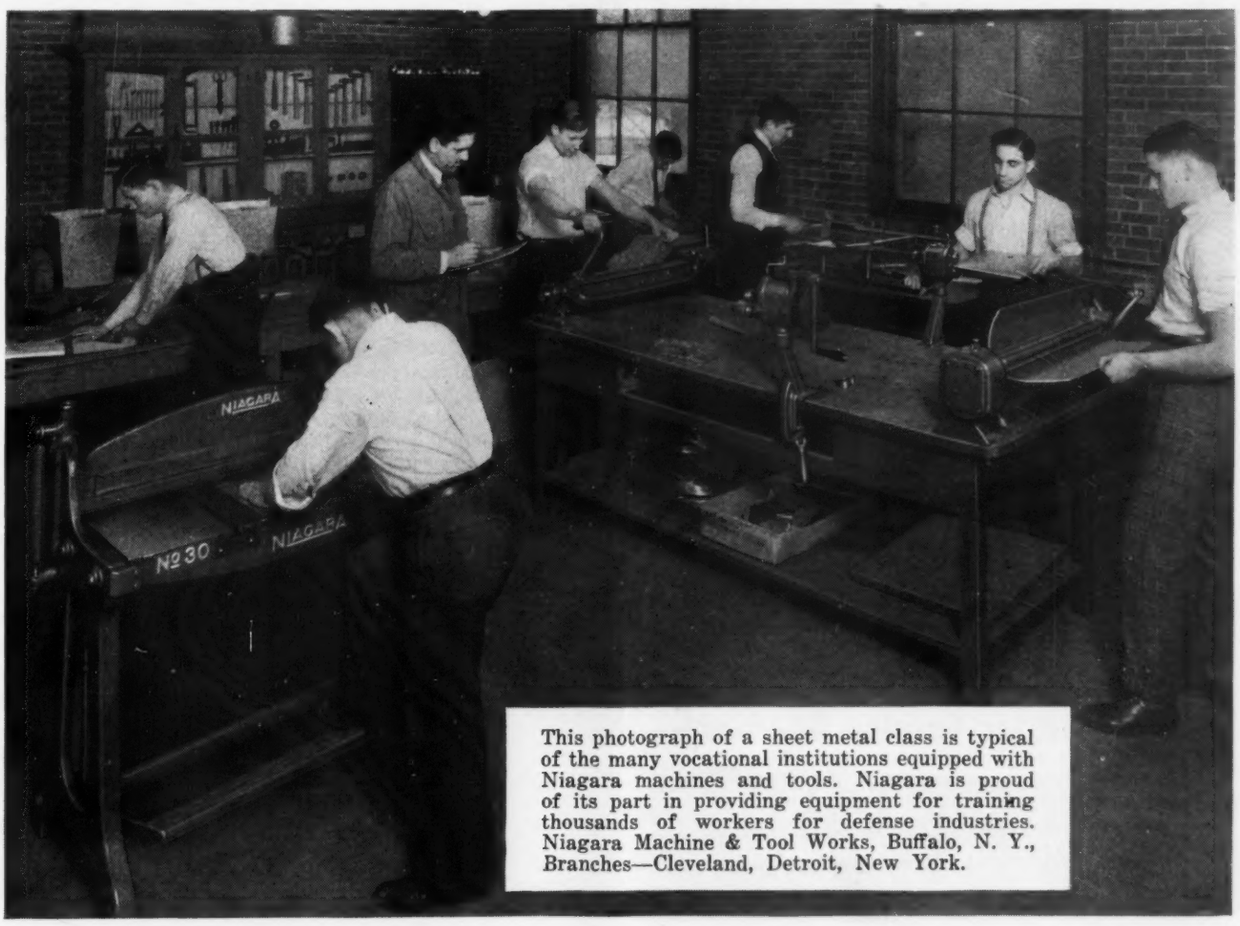
For the man who wants to step out and double his profits in the next season in spite of changed conditions, this plan offers a real opportunity. It tells you how . . .

. . . to find new furnace prospects
. . . to avoid the difficulty of getting parts
. . . to make quick profits on repair jobs
. . . to retain prospects for new furnaces
. . . to give customers more for their fuel dollars
. . . to increase new-furnace business

The details of this plan are available to furnace men who are willing to start out on a brand new method of building up their position in the community.

Get Your Copy Now!

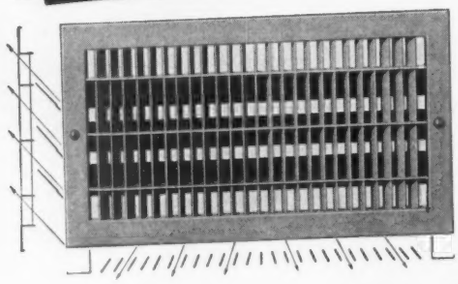
FIRELINE STOVE & FURNACE LINING CO.
1816 Kingsbury St. Chicago, Illinois



This photograph of a sheet metal class is typical of the many vocational institutions equipped with Niagara machines and tools. Niagara is proud of its part in providing equipment for training thousands of workers for defense industries. Niagara Machine & Tool Works, Buffalo, N. Y., Branches—Cleveland, Detroit, New York.

INDEPENDENT "Fabrikated" REG. U.S. PAT. OFF.

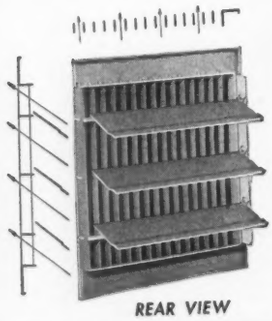
DIRECTED AIR FLOW GRILLES with Deflecting Vanes



No. 321A WALL GRILLE

Gives Compound Direction to Air Flows with Certainty

Each grille bar can be adjusted individually to direct air flow to the right, left or fanwise as illustrated. Adjustment can be made either before or after installing. Grille bars remain firmly in position without locking, and will not vibrate nor rattle.



REAR VIEW

Horizontal deflecting vanes in back may be individually adjusted to give upward or downward deflection to air flow.

EVERY GRILLE BAR IS INDIVIDUALLY ADJUSTED

Send for Catalog No. 41-AC

641

THE INDEPENDENT REGISTER CO.

3747 E. 93rd STREET • CLEVELAND, OHIO

Association Activities . .

(*Continued from page* 83)

38th Philadelphia Outing

The Roofing, Metal & Heating Engineers of Philadelphia held their annual outing at the Oak Terrace Country Club, out York Road just beyond Willow Grove, on Wednesday, June 25th.

Those who were present at our Outing can appreciate what the poet meant by "What is so rare as a day in June," for it was a gorgeous day and well over one hundred men in the industry and their ladies made the most of the holiday.

The golfers came early and in force and the crack of the club and the cry "fore" could be heard from early morning to mid-afternoon. Groups were scattered about the club grounds under the shade trees and under beach umbrellas around the swimming pool for the weather was just right for a swim and the varied colors of the ladies bathing suits made a very colorful picture against the beautiful scenery of the surrounding country-side. There were a number of new faces present. Games were played or those present just "lounged" in the shade.

After a swim and shower then the dinner (no speeches), there followed music, prize drawing, a floor show and dancing until late. Favors were presented to each lady.

Expressions of approval were heard all around and the Committee on arrangements received congratulations. Those from "out-of-town" were agreeably surprised with the welcome and entertainment they received.

B. F. John, Secretary.

◆

Fox Valley, Illinois

The second meeting of the Minneapolis-Honeywell Control school for the Fox Valley Sheet Metal & Furnace Contractors' Association was held June 25 at Burrell Conover's. There were 20 present.

George Tansil was back on the job again after his recent illness. After reviewing the preceding lessons we started on relays and different types of thermostat—clock types included—high limit controls and gas valves.

The controls were passed around to be handled and examined by each one in the class, after which Mr. Tansil explained the use and how to adjust them—during which questions were asked by the students.

The men in the Valley are really taking to this type of school and seem to be enjoying it very much.

Fred R. Lamp, Secretary.

◆

Wisconsin

The Board of Directors and District meetings held at Madison on June 7th were a complete success. The meetings were held at Mendota Lake Shack on beautiful Lake Mendota owned by Louis Hirsig of Wolf, Kubly and Hirsig.

The Madison Committee composed of members Paul Krueger, G. F. Wolf and others, in charge of the arrangements, performed their tasks satisfactorily.

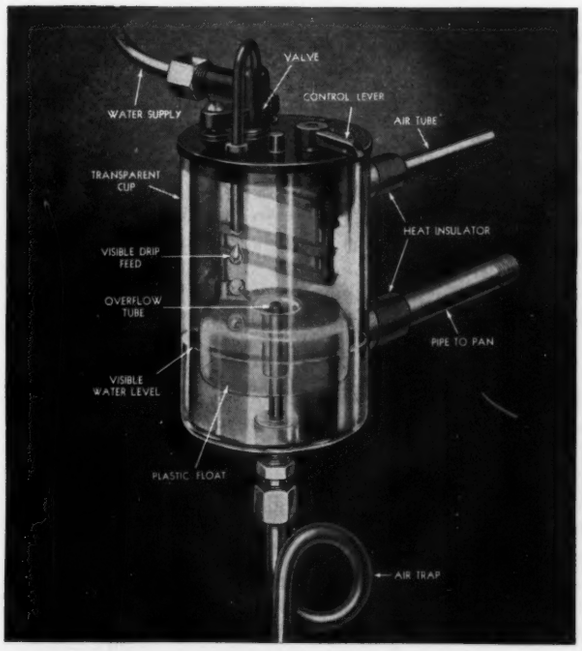
Paul L. Biersach, Secretary.

Obituary

Albert Derheimer, 55, one of the Derheimer Brothers, 1024 Barr St., Fort Wayne, Indiana, met death in Lake James on June 16, while fishing.

◆

George E. Sorenson, a member of the Roofing, Metal & Heating Engineers, Inc., Philadelphia, passed away recently due to a fall. Mr. Sorenson rendered several lively songs at the March banquet of the association. He was much interested in association affairs, lent valuable assistance to the office and proposed matters for the benefit of the trade at the meetings which the Association adopted. His home was at 2062 South 59th Street.



MONMOUTH FLOTROL

the world's finest float control

The Flotrol has EVERY feature required for a perfectly functioning float control. Other controls claim this or that SINGLE advantage, but Monmouth's acknowledged leadership in humidification engineering provides the Flotrol with ALL these exclusive advantages:

VISIBLE WATER LEVEL—A glance at the transparent Flotrol shows height of water in pan. Unnecessary to remove a hot cover and peer around inside.

VISIBLE DRIP FEED—It's easy to see the Flotrol working and know how fast the water is evaporating. But with other controls you can't tell without opening the furnace.

EXTERNAL WATER LEVEL CONTROL—A mere touch of the finger changes water level and evaporating rate. No guesswork or fussing around inside.

SEALED IN MECHANISM — Because it is absolutely trouble-free, corrosion-proof and lime-proof, the Flotrol is the only control that can be permanently sealed to prevent tampering.

SELF-FLUSHING DIAFRAM VALVE—This enclosed, frictionless, non-leaking and non-liming valve is an exclusive Flotrol feature.

All these advantages and many others make the Flotrol the peer of all float controls. Moderate price due to modern volume production. Get the complete story. Write now to:

MONMOUTH PRODUCTS COMPANY
1933 East 61st Street Cleveland, Ohio

MONMOUTH
The Greatest Name in Humidification

Compare the wet strength of Ruberoid 95% pure Asbestos Paper with the average asbestos paper on the market. You will be amazed! This extra strength—obtained by a special processing—*saves you time in application.*

Ruberoid Asbestos Paper has everything! Wet strength, accurate caliper, color and finish. The color—a soft natural blue-white. The finish—smooth on one side; rough textured for adhesion on the other side.

We urge you to try Ruberoid Asbestos Paper for wrapping furnace pipes—protecting air conditioning ducts, wood partitions, lining stoves, ovens and gas ranges. Mail coupon for free 5-foot sample. Compare its wet strength, flexibility, color, finish and ease of application.

FOR GREATER THICKNESS ASBESTOS ROLL BOARD
Has greater flexibility and strength. Wraps around small diameters without cracking. Plied to make thicknesses ⅛ and ¼.

RU-BER-OID
ASBESTOS PAPERS

The RUBEROID Co., *Insulation Division* AA—7
500 Fifth Avenue, New York City

Send us your free 5-foot test sample of Ruberoid Asbestos Paper. We understand this places us under no obligation.

*Name*_____

*Address*_____

*City*_____ *State*_____

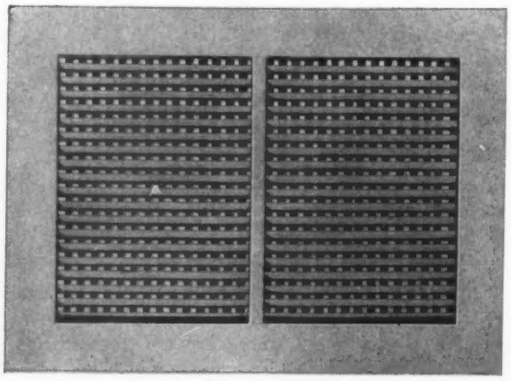
Since Ruberoid sells through wholesale trade only, please give jobber's name.

FREE THIS CANISTER CONTAINING *5 foot Sample*

DOUBLE ADJUSTABLE GRILLES

● MODERN IN STYLE

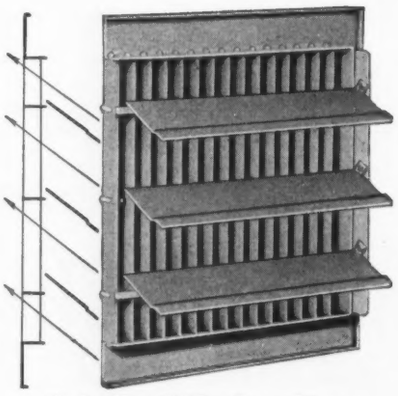
● MODERN IN UTILITY



Style No. 5050HA

This design has horizontal bars on face adjustable in groups and vertical bars on back adjustable in groups, allowing horizontal deflection of air upward or downward from straight flow to 45° either direction, and vertical deflection of air to the right or left from straight flow to 45° to the left, and 45° to right. **Bars ½" deep x .083 (No. 14 ga.) Cold rolled steel round edge flat bar stock, spaces on ⅜" centers.** Can be furnished with Multiple Valve Louvres attached on back.

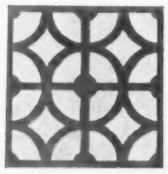
AIR CONDITIONING GRILLES with DEFLECTING VANES



Style No. 3320—Rear View

Vertical adjustable grille bars on face to direct air flows right or left with adjustable deflecting vanes 1½" wide on back to direct air flows up or down.

Stamped Ornamental Grilles for Heating and Ventilating Installations.



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STANDARD STAMPING & PERFORATING CO.
3137 W. 49th Pl. Chicago, Ill.

Kruckman—The Housing Situation

(*Continued from page* 40)

New York and Jamaica insuring offices of FHA, have been found to be useful without many modifications. Thulman says the modifications are so immaterial that it is useless to mention them in detail. The requirements are being placed in effect throughout the country through all FHA offices as swiftly as the peculiar circumstances of the moment permit. Thulman also urges that the warm air heating industry apply its wisdom to finding substitutes for zinc, for copper, and for other materials upon which they now depend, and which may be rapidly withdrawn by Mr. Henderson.

Housing Expenditures and Needs

Under Defense Housing Administrator Charles F. Palmer, the Government has either spent, or has committed itself to spend, over $600,000,000 for homes for defense workers in 168 defense industrial centers. Over 15,000 homes have been finished, 70,000 are in course of construction, and 15,000 more have been allocated. These homes average $3,000 per unit. There are over 132 defense industrial centers which need collectively at least 125,000 home units additional. Congress is on the brink of providing another $500,000,000 to launch this new housing program. All 12 agencies of Government that may build or stimulate the building of defense housing will be brought into action.

Mr. Palmer and Mr. Ferguson and the rest agree that from July 1, 1941, to June 30, 1942, we must add at least 625,000 residential units to our new

BILL, I'VE BEEN HEARING A LOT OF GOOD REPORTS ABOUT THARCO FURNACE CEMENT LATELY
LATELY? WHY, THARCO'S BEEN THE BEST THERE IS FOR 30 YEARS

OLD-TIMERS in the heating game don't need a lot of high-powered sales arguments to convince them of the value of a furnace cement. They find out from experience. That's why Tharco is used and recommended by more furnace manufacturers and repair men than any other furnace cement made. Try it on your next job.

manufactured only by

THE ARMSTRONG COMPANY

DETROIT DALLAS CHICAGO

homes resources. At least 525,000 units must go into defense areas. The Defense Administrator is planning to secure means to build 125,000 units directly with funds appropriated for the purpose by Congress. This leaves 400,000 units to be built by other agencies. Mr. Palmer is convinced they may be built by "private operators." He bases his hope upon the figures provided by the Bureau of Labor Statistics for 1940. The Bureau reports that of 537,000 dwelling units under construction in 1940, 87%, or 466,000, were privately financed.

When Mr. Palmer says "private operators," he thinks in terms of builders or enterprising individuals who will use the facilities of the FHA to secure the backing to build the homes. At the same time Mr. Palmer is urging the banks to make loans without Government guarantees. Says he: "Banks loan money to Government at ½ of 1%, and Government turns around and loans the money to business and to individuals at 3%. Now why don't you bankers loan the money to business and to individuals at 2½% and freeze Government out?"

Need Houses As Badly As Bombers

Palmer and Nelson and Henderson and others of the group feel that essential defense work has been delayed for lack of housing, and that there are serious delays ahead unless housing can be rushed as much as bombers and other needs for War. The general feeling is that the program should be pitched at an objective of 800,000 defense housing units next year. Palmer is responsible solely to the President, and it is sensible to assume he reflects the White House. It is his idea that the building program must be secured by direct Government construction, by

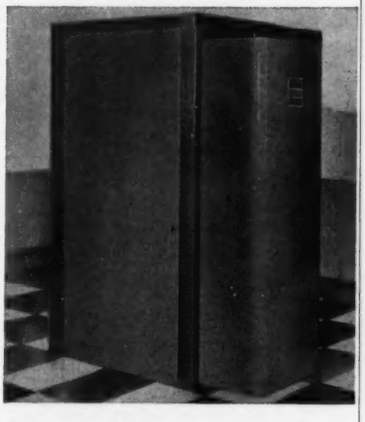
As dependable as the SUNRISE!

The SUN FUEL MASTER

Automatic Oil Furnace

- Compact
- Efficient
- Handsome

Complete with Gun Burners Basement & Utility Room Units from 60,000 to 400,000 Btu per hr.



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Territories Available
Write Today for Details

J. V. PATTEN COMPANY
200 DeKalb Ave. Sycamore, Ill.

CAN YOUR SHOP turn out 100 Pittsburgh Locks in 45 Minutes?

ONE MAN AND A LOCKFORMER CAN DO IT EASILY!

Time and labor savings effected by the Lockformer are so great as to be almost fantastic. Hundreds of owners tell of extra profits that are simply astonishing.

Five minutes at a Lockformer will tell you definitely whether these claims are just claims—or whether you've been missing out on the biggest money maker in the whole sheet metal business. Send the coupon and find out!

Lockformer Company
4615 Arthington St., Chicago, Illinois
Gentlemen: ( ) I'd like a demonstration—( ) send me more information.

Name .....

Address .....

City ..... State .....

THE LOCKFORMER CO.
4615 ARTHINGTON STREET, CHICAGO, ILLINOIS

THE SUCCESS of your business depends upon the success of the equipment you install. With PACIFIC equipment, you'll gain a satisfied customer *every time* . . . because it's unsurpassed in the heating field for trouble-free operation, for heating economy, for stream-lined beauty, for convenience!

PACIFIC Model A-69 Forced Air Furnace illustrated above *heats* in winter, *ventilates* in summer. Blower and heating units are separate for quick, easy handling, yet are readily unitized right on the job. Interchangeable panels give complete adaptability to any requirement. All controls, wiring, etc., are completely self-contained.

In winter, by simply setting a thermostat, desired room temperature is maintained *automatically*. In summer, the electric blower floods the home with refreshing ventilation!

☆ ★ ☆ ★

Advanced Design Wins Buyers to PACIFIC

WHY THE PACIFIC Round Heating Element is Superior!

The design of the heating element is a vital point in the operating efficiency and service life of a gas unit. The PACIFIC-developed *round* heating element in the Model A-69 is an advancement of major importance because:

. . . a curved sheet is more rigid than a flat sheet. Therefore, cylindrical walls are more rigid . . . hold their shape better . . . do not warp under continual expansion and contraction of heating and cooling.

. . . absence of corners in cylindrical design insures more efficient air flow through the furnace.

★ ☆ ☆

Whether it's for home or commercial use, PACIFIC Model A-69 is a sturdy, dependable "best seller" for every heating and ventilating need. It's available in a wide range of heating capacities, with advanced features that guarantee years of satisfaction for your customers—*more sales for you*. Ask for details!

Address Dept. AA-741.

Pacific GAS RADIATOR CO.

HUNTINGTON PARK CALIFORNIA

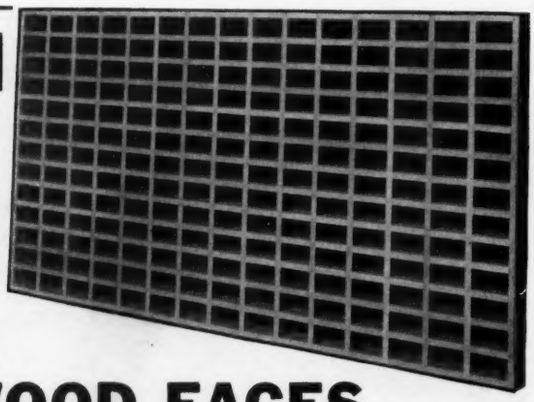
Government underwriting and by private investment. Moreover, it is his idea that rising rents in defense areas must be forced down by more defense housing.

Palmer opposes decentralization of cities by building new home communities outside of metropolitan areas. He urges defense housing should be built within municipal service areas by opening new lands in the area and by rehabilitating old places as well as erecting new structures. He wants local Governments and local elements to help to bring the defense communities into existence. At the same time Palmer is all-out for the decentralization of the Capital itself, now overcrowded with 100,000 new people who have come here to take jobs in the expanding agencies since January 1. The housing situation as well as the problem of furnishing office room is desperate. Palmer has discovered there is at least 35,000,000 square feet of vacant office space in leading cities of the country, and he has sold the President the conviction that some Federal agencies should be transferred to these cities, and elsewhere. By the time this is published the President may have issued the Executive Order transferring several agencies, even as far West as San Francisco.

This spells more housing in various towns and cities. We are told here that over 1,000,000 workers must be imported to 68 places in various sections of the country in the next two or three months. That means more housing.

Perhaps of interest to readers is the $150,000,000 appropriation which will enable the Federal Works Agency to build sanitary and other facilities, and new schools, hospitals, and similar community buildings, in defense communities already existing, com-

MARSH



WOOD FACES . . .

Inexpensive register installation consistent with striking beauty is readily obtainable by the use of Marsh Wood Faces on air conditioning, heating or ventilating jobs.

Marsh Wood Faces are constructed of the finest kiln-dried oak accurately machined on specially designed machinery for the specific purpose of making wood faces.

Use these modern, efficient Wood Faces on your next installation. They'll be your choice from then on. Write today for further information.

MARSH LUMBER CO., INC.
DOVER OHIO

munities which came into existence so fast, or expanded so swiftly, that they virtually had none of the essentials of community life.

USHA has just issued instructions that have a profound significance to all those involved in Government construction, and which foreshadow what is expected to happen in connection with all building in the United States, public or private.

The instructions prohibit completely the use of aluminum and zinc. Bronze, brass, nickel, tin, copper, iron, steel, may be used only by special license from the Government. Unless it can be certified the building will suffer, paint is to be used in place of galvanized iron or steel.

USHA building operations are to be limited to concrete, cut stone and wood, to the utmost extent. Wood already is regarded as potentially susceptible of further restrictions. Cement is not yet considered scarce.

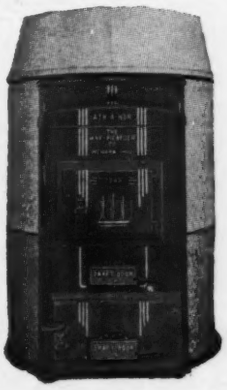
The USHA instructions are expected to save from ½ to 1 ton of metals on each USHA house, needed for defense industries.

Probably before this is published, the same regulations will be applied to buildings erected by Public Buildings Administration, Farm Security Administration, Defense Homes Corporation, and to buildings erected under contracts approved by the Defense Housing Corporation. It is likely the same regulations will be suggested in connection with Title VI of FHA underwritings, and in connection with other FHA undertakings. The off-record understanding is that this system of conservation may be urged by agencies concerned with all activities through which the Federal Government touches building and construction, public or private.

50 YEARS OF LEADERSHIP

The Time-Tested

ATH-A-NOR



Furnaces, like any other piece of merchandise, are only as good as the people who make them. The May-Fiebeger Company has been making the ATH-A-NOR Furnace illustrated for over fifty years, and the fact that it will perform with unusual efficiency and economy is backed up by hundreds of satisfactory installations.

If you've been looking for a fast-moving, top performing gravity furnace to round out your line, investigate the ATH-A-NOR now! A postcard request will bring literature.

- QUALITY
- ECONOMY
- EFFICIENCY

. . . write today for further information!

MANUFACTURERS OF QUALITY HEATING EQUIPMENT FOR OVER 50 YEARS

MAY-FIEBEGER COMPANY

NEWARK OHIO

COLD OR WARM YOU CAN MAKE IT PAY A COOL PROFIT IN HOT WEATHER WITH . . .

Kooler-aire

THERE are two types of Kooler-aire Cooling Systems using water as the cooling agent. One cools by *Direct expansion cold water coils.* The other cools by water *evaporation* through the USAirCo patented Gyra Spray.

Where water of 60° or colder is available, *Cold Water Coil* Kooler-Aire provides the practical answer. Where cold water is not available, Gyra Spray *Evaporative* Kooler-aire meets the demands of stores, offices and homes for business-building, comfort-providing cooling.

Both types of Kooler-aire are *all-in-one-package* systems—complete, compact, attractively designed, easy to install. Both are made in capacities to fit the cooling needs—and budgets—of any business—any home. *Because neither requires mechanical refrigeration,* first cost and operating cost are extremely low.

Whatever the temperature of the water—it's the temperature of the air—the hot, dry summer air—that makes Kooler-aire sales so easy and so profitable. There are scores of *"hot prospects"* in your town ready to buy comfort cooling right now. You can get your share of this profitable business with USAirCo's engineering, sales and advertising help. But don't delay longer—*the season is here now*—send the coupon at once!

UNITED STATES AIR CONDITIONING CORPORATION

Northwestern Terminal, Minneapolis, Minnesota

Send data on items checked to

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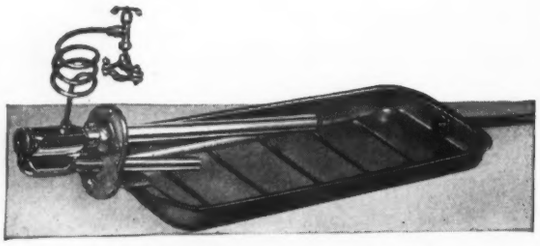
☐ Cold Water Cooling
☐ Evaporative Cooling
☐ Refrigerative Cooling
☐ Ventilating Blowers
☐ Furnace Blowers
☐ Heat'g & Cool'g Coils
☐ Air Washers ☐ Grilles
☐ Filters ☐ Humidifiers

Want Your Furnace Jobs to Stand Out?

Equip with THERMO-DRIP



STAND OUT furnace jobs can make a lot of difference in a homeowner's attitude toward your competitors. With a reputation for such jobs, you don't have to "pull your punches" to convert bids into sales.

But make no mistake about what constitutes a stand-out warm air job. Remember, your furnace is expected to reproduce NATURAL warmth and comfort. That calls for correctly moistened warm air—not just mechanical or manual filling of water pans, but the addition of moist vapors to the heated air IN DIRECT RATIO to temperature. And it takes a temperature-controlled humidifier to properly balance humidity with temperature.

THERMO-DRIP is that kind of humidifier. The amount of vaporization it produces is governed strictly by the amount of water its temperature controlled feed valve admits to the vapor pan. It's measured moisture!

Include this scientific method of humidification in all your furnace jobs . . . then listen for the tongue-wagging by customers whose furnaces became stand-out performers as a result of this more efficient humidifier.

Ask Your Wholesaler or Write Us for Complete Details

AUTOMATIC HUMIDIFIER CO.
18th and Main Sts., CEDAR FALLS, IOWA

THERMO-DRIP
Automatic **HUMIDIFIER**

Short Method Technical Code

(*Continued from page* 53)

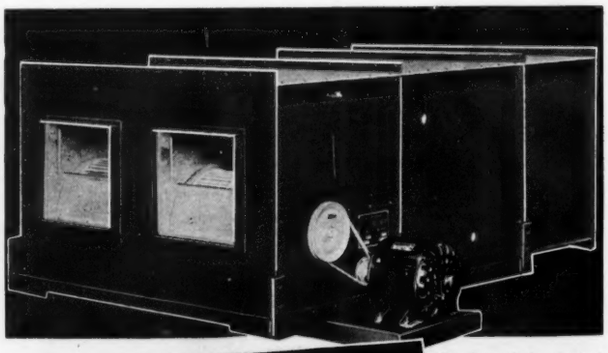
exceptionally long run or one having more than three right angle short radius stack elbows or their equivalent shall be sized one size larger than normal.

Gravity Pipe Sizing

In order to further simplify the figuring of heating jobs, and to eliminate the necessity of knowing several different codes and keeping in mind several sets of figures, we later developed a companion system for gravity and conversion heating jobs.

At the beginning of this article we presented a method of figuring the heat loss of a house. It makes no difference whether a house is to be heated by forced air or gravity, the heat loss is the same, the only difference being in the sizing of the pipes going to each room.

We know from tests which have been made that gravity pipes properly installed will carry a certain amount of heat for each square inch of pipe area. This figure for first floor runs is 111 Btu per hour and for second floor runs is 167 Btu per hour. Therefore, if we know the Btu heat loss of a room and divide this figure by the Btu which one square inch of pipe will supply, we will secure



CLARAGE

Designed to control temperature and humidity within close limits. Can be made completely automatic in operation, regulated by room thermostat and humidistat.

Multitherm Units

✓ Cooling
✓ Heating
✓ Complete Conditioning

Finest type of equipment available for small summer cooling, winter heating or complete year-round air-conditioning jobs. Widely used in factories, offices, stores, etc. Highly efficient; remarkably compact; easily installed in any idle space.

Write for Bulletin 107 describing various arrangements and giving capacity ratings.

CLARAGE FAN COMPANY
872 PORTER STREET · KALAMAZOO, MICH.
Sales Engineering Offices in all Principal Cities

the number of square inches of pipe area needed to supply this heat.

Our gravity pipe size therefore is

Heat loss 1st floor room ÷ 111 = sq. in. basement pipe area on gravity.

Heat loss 2nd floor room ÷ 167 = sq. in. basement pipe area on gravity.

Wall stacks to second floor must be at least 70% of the area of the basement pipe.

Conversion Systems

In recent years there have been many jobs converted from gravity to forced air. These jobs, if you have to start from the beginning and figure the heat loss of the house, take a lot of time. It often happens that the house has heated all right on gravity; however, the customer may desire a more even heat, or the elimination of cold corners, or more room in the basement—just several of dozens of reasons for converting this job to forced air. In such a case all the dealer wants to know is what size the basement pipes should be when changed from gravity to forced air sizes.

In the gravity system above we stated that on gravity the basement pipes would be supplying 111 Btu per hour per square inch area of pipes to 1st floor and 167 Btu to 2nd floor. Therefore, if we know the basement pipe size and therefore its area, we can multiply this area by 111 (or 167 as the case may be) and determine how many

THE BEST ANSWER!

★ BETTER PRODUCTION ★ INCREASED EFFICIENCY

★CUT ANY SHAPE
★ANY SIZE SHEET!

Production problems quickly smooth out when there's a Marshalltown Throatless Shear on the job. Does hundreds of odd shearing jobs better and quicker —from straight splitting to any shape imaginable.

Available in sizes from 18 gauge to ½" capacity.

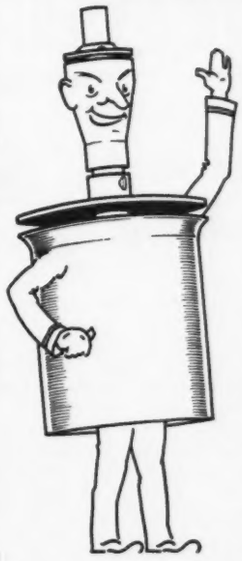
No. 18 Hand Power

MARSHALLTOWN THROATLESS SHEARS

★ Send at once for special shear bulletin! ★

MARSHALLTOWN MFG. COMPANY
920 Nevada Street, Marshalltown, Iowa

"Making Burners Is Our Business"

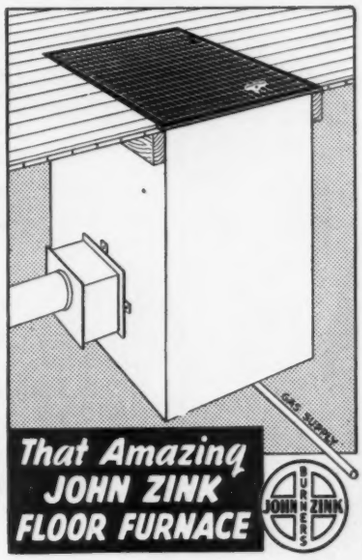


Every gas appliance is only as good as its burner. Designed to do a specific job — John Zink Burners must be good! Wherever gas or oil is used for fuel—John Zink makes a better burner for you to use.

JOHN ZINK FLOOR FURNACES

FEATURES—Rapid Air Circulation, Quiet Operation, Uniform Heat Distribution through Register, and Durability.

SIZES — The John Zink Floor Furnace is built in three sizes—the input ratings are 25,000 B.t.u., 50,000 B.t.u., and 68,000 B.t.u.



The One Port Floor Furnace

WRITE FOR INFORMATION

John Zink Company
TULSA, OKLA.—4401 S. PEORIA AVE.
Chicago, Ill.—7309 E. End
New York City—342 Madison Ave.
Dallas, Texas—2405 S. Harwood
Houston, Texas—4433 Leland Ave.

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"A MOST IMPORTANT FACTOR IN OUR GROWTH"

"We have used Premier Furnace Cleaners for almost ten years and we know that they've been responsible for a large part of our business year after year. We have sold complete furnace installations running as high as $1,000 from a simple $4 cleaning job. Our Premier Cleaners are always ready to go—and believe me, *we work them hard!* In our setup a Premier Furnace Cleaner is just as important as a brake."

Says Don Fisher, A-Home Heating, Inc., Cleveland, O.
Dealers for: Minneapolis Honeywell Controls, XX Century Furnaces, Iron Fireman Stokers

★ ★ ★

Premier's powerful one-man furnace cleaner can be a most important factor in *your* business, too—earning profits on cleaning jobs, getting invaluable leads for you on your repair work and new sales. Write today for information about this money-maker—and about business-promoting post cards that will help you line up prospects!

NEW IMPROVED MODELS

Completely Equipped

5/8 H. P. . . . $69.50

1 H. P. $89.50

Complete Chimney Cleaning Equipment Only $9.00.

ELECTRIC VACUUM CLEANER CO., INC.

1730 IVANHOE RD. • CLEVELAND, OHIO

Btu's are being delivered to this room with the old gravity system.

The next step would be to convert this Btu required to cfm required. We know that on gravity systems, usually having floor registers or sometimes baseboard registers, we must carry a fairly high register temperature. The Technical Code gives us these factors, and the factor for 140 degree register temperature is .014. That is, if we multiply the Btu by this cfm factor we will secure the cubic feet per minute required to deliver the necessary heat to the room at 140 degree register temperature.

We have simplified this figuring for you by figuring the number of cfm required per square inch of gravity basement pipe and presented this as one factor as follows:

Multiply area of gravity basement pipe to room
by 1.6—For 1st floor rooms.
by 2.3—For 2nd floor rooms.

The result is the cubic feet per minute required by the room using forced air circulation.

With this answer, proceed exactly as though you were designing a forced air duct job as instructed earlier in this article.

In presenting these ideas we sincerely hope that some benefit may be derived by the industry and may help to a small extent in the simplification of the country's fastest growing industry.

G&O COILS

Detail of mechanical joint used in Universal Heat Transfer Coils.

FOR HEATING AND COOLING IN A WIDE RANGE OF SIZES

•

Send for Catalog

•

THE G&O MANUFACTURING COMPANY
New Haven, Connecticut
Pioneer Manufacturers of Square Finned Tubing in the United States

Degree Day Method of Estimating Fuel Costs

(*Continued from page 60*)

60%, the total heat to be supplied to the heating plant will be:

$$\frac{(200{,}000)\ (24)\ (6500)}{(80)\ (.60)} = 650{,}000{,}000 \text{ B.t.u.}$$

If they are to use 12,000 B.t.u. coal at $8.00 per ton they will use:

$$\frac{650{,}000{,}000}{(2000)\ (12000)} = 27 \text{ tons at a cost of } \$216.$$

If they are to use No. 3 oil at 7c, in a unit whose overall efficiency is 70%, they will require:

$$\frac{(200{,}000)\ (24)\ (6500)}{(80)\ (.70)\ (140{,}000)} = 4{,}000 \text{ gal. at a cost of } \$278.$$

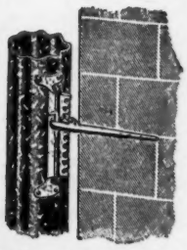
This indicates how the method can be adapted to any fuel, any building, and any heating plant without the necessity of complicated formulas and tables. The degree-day is the universal unit that makes this possible.

Degree Day Approximate But Satisfactory

It must be kept in mind that this method is approximate. Some of the figures are controversial. For example, would it not be more ac-

-BB-

SHANKS and CIRCLES



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The only really complete line of hooks and hangers. Send for complete descriptive literature.

Sold Through Leading Jobbers Everywhere

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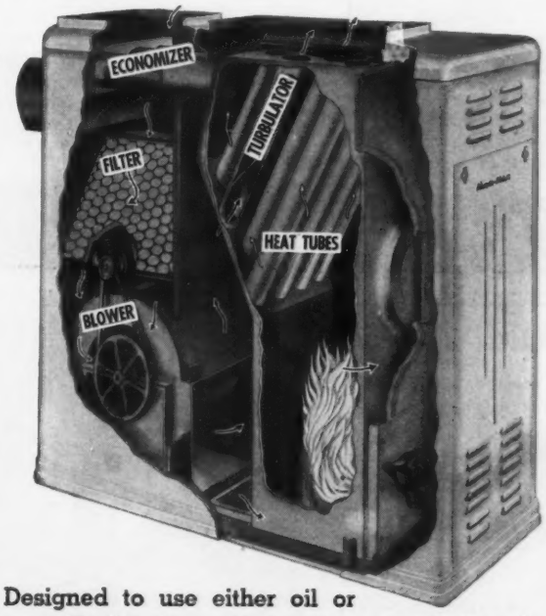
Make More Money with MOR-MAC

Regardless of what type or make of heating equipment you now handle, it will PAY YOU TO GET THE FACTS about Mor-Mac Tubular Winter Air Conditioners and the Mor-Mac Direct to Dealer Plan.

For Mor-Mac marks a distinct advance in the science of forced warm air heating. It adapts the time-proved principle of the tubular boiler to a warm air furnace, and the result is the most efficient and compact heating unit now on the market.

In the cut-away drawing below, note particularly the Heat Tubes and the Turbulators. They are important factors in giving Mor-Mac a higher efficiency than any other unit in its size class. Unusually heavy gauge, all-welded steel is used throughout. Complete tooling and die-stamping make assembly easy. Mor-Mac is truly a quality product and yet is PRICED BELOW MOST COMPETITION.

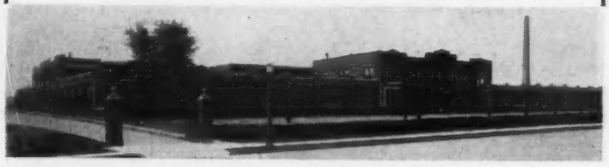


Designed to use either oil or gas. Easily changed over from one fuel to the other, if desired. Your sales insurance in the face of the present emergency!

The Mor-Mac line of winter air conditioners is admirably designed and priced to not only meet the needs for modernization but also the requirements of the unprecedented FHA New Home Building Program. Investigate the MOR-MAC DIRECT TO DEALER PROFIT-MAKING PLAN. Mor-Mac's exceptional manufacturing facilities and large plant capacity are your best protection against delays.

Write or wire today for complete specifications, prices, etc. DON'T DELAY.

MORRISON STEEL PRODUCTS, Inc.
601 AMHERST ST. BUFFALO, N. Y.



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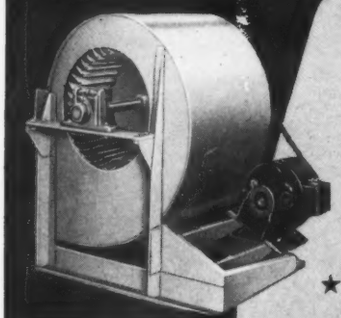
COMPETITIVELY PRICED . . . SOLD DIRECT
TO MAKE YOU MONEY



★ Delivers more air per revolution than any other blower of its size.
★ Patented motor mount automatically maintains proper belt tension.
★ Extra heavy construction for long life. No chatter. No vibration.
★ Exclusive fan design for greater capacity. QUIETER, almost noiseless.

PATENTED BEARINGS
GUARANTEED
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Self-aligning — self-lubricating. Require no attention. No rubber to deteriorate.

Here's the blower you've been hoping for! Quality-built, yet competitively priced and sold direct from factory to you. *Gives you extra profit.* Get the facts on QUIET-AIR—full proof that it's a new profit opportunity for you!

MAPLE CITY STAMPING CO.
PEORIA, ILLINOIS

Don't Delay Longer

Improve your business with a

GRAND RAPIDS FURNACE CLEANER

Free Trial
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WATER-BOY FEED VALVE

Convert hand feed humidifiers into Automatic jobs with Maid-O'-Mist's No. 59F Automatic Water-Boy Feed Valve. Dependable and low in cost it assures efficient, uniform humidification. Comes complete with 6 ft. of ¼" O. D. Copper Tubing and a Quick Hook-up Saddle Valve. Its installation is most simple. The No. 59F is approved by the National Plumbing Lab. against back siphonage . . . and being built completely of non-ferrous metals assures long life.

Remember . . . Maid-O'-Mist manufactures Humidifiers for all types of heating systems. Get complete information NOW.

MAID-O'-MIST, INC.
213 North Aberdeen Street Chicago, Illinois

curate to use hourly averages instead of daily mean temperatures in calculating degree days? It might be, but tests at Pennsylvania State College over a period of years show a variation between the two methods of about 3 per cent or less. Furthermore, the Weather Bureaus do not deal in hourly averages, but give the mean temperatures and base degree-day calculations upon them. There is a great deal more work involved with the average method, and it probably is not worth it.

The figure 6,500 is for the "normal" heating season. Heating seasons in this territory have shown as high as 7,200 degree-days and as low as 5,500. Estimates based upon 6,500 degree-days would be fairly accurate in a normal heating season.

Wind effect and sun effect are frequently mentioned as variables not taken into account. Tests on this score at the University of Wisconsin indicate that temperature is the dominant control, having a coefficient of determination of 94 per cent. Wind and sun effects apparently compensate for each other.

Heating plant efficiencies are open to argument also. It must be remembered that a heating plant is not always operating at the efficiency that is measured at one given time. When standby loss and changes in stack loss at various firing rates are taken into account, a stoker fired job that shows an overall efficiency of 70 per cent on test may deliver only 60 per cent over a heating season.

Degree-days have several other uses besides estimating fuel costs. Fuel companies use degree-day records to govern automatic deliveries. After establishing a customer's "degree-days per ton of coal" or per gallon of oil (exactly as you would determine the miles per gallon of gasoline per your car) the fuel dealer can determine the fuel needs according to his "degree-day calendar."

The degree-day constant, or degree-days per ton, is also used as an indication of heating plant efficiency. A drop in the constant would indicate an abnormal condition in the heating plant or conditions of occupancy, just as a drop in your miles per gallon indicates something wrong with your car.

A degree-day record is the only accurate way to compare the severity of one heating season with another. Comparisons with such records indicate what can be expected in the way of fuel savings or increases over previous heating seasons.

The information available on degree-days could probably be improved upon if someone should take the trouble to carry on more intensive investigations. However, the above uses and methods will suffice for practical use by the average dealer.

Libert Hi-Speed *Shearing*

Saves Time—Labor—Money

Sheet Metal Shops! You'll enjoy these advantages with

LIBERT Hi-Speed SHEARS

- Increase Production—through faster cutting, with less effort.
- Save Finishing Time—edges are always smooth, clean, flat, requiring no further finishing.
- Save Money — one machine cuts great variety of shapes without adjustment. Cuts rings or circles, flat or formed pieces, plain or intricate shapes, in sheet metal, stainless steel, expanded metals, up to and including 10 gauge mild steel sheet.

For more profitable Shearing, see your Libert Distributor—or write for latest bulletins.

LIBERT MACHINE COMPANY

GREEN BAY • WISCONSIN

MANUFACTURERS OF SHEARS SINCE 1915

Libert Hi-Speed SHEAR

FLANGED and DISHED FURNACE HEADS

Commercial flanged and dished heads have been furnished to the industry for years. These heads are die formed, have smooth flanges, and uniform diameters, thus a close smooth fit against the body of the furnace is obtained, which prevents escape of gas.

Commercial heads are made in standard outside diameters of 22″—24″—26″—28″ with straight flanges, having no outward flare, weld or riveting flange.

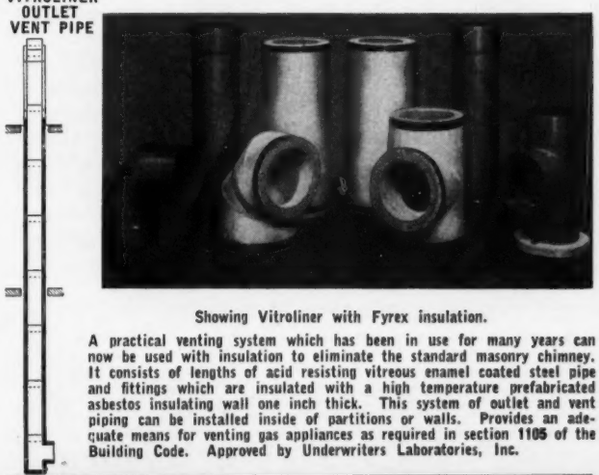
THE COMMERCIAL SHEARING & STAMPING CO.
YOUNGSTOWN, OHIO

ARE MASONRY CHIMNEY'S OBSOLETE?

Investigate the New **VITROLINER** -the Superior Vent Pipe

SPACE SAVING, ECONOMICAL, SAFE, DURABLE, UNIFORM

VITROLINER OUTLET VENT PIPE



Showing Vitroliner with Fyrex insulation.

A practical venting system which has been in use for many years can now be used with insulation to eliminate the standard masonry chimney. It consists of lengths of acid resisting vitreous enamel coated steel pipe and fittings which are insulated with a high temperature prefabricated asbestos insulating wall one inch thick. This system of outlet and vent piping can be installed inside of partitions or walls. Provides an adequate means for venting gas appliances as required in section 1105 of the Building Code. Approved by Underwriters Laboratories, Inc.

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Ask our engineering department to help you solve any difficult and unusual venting problems

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QUALITY EQUIPMENT-- FROM HESS-- COSTS LESS

DEALERS---Write for our New 1941 Portfolio

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HESS BLOWER FILTER UNITS
HESS WELDED STEEL FURNACES
HESS AUTOMATIC OIL BURNERS
HESS AUTOMATIC COAL STOKERS

ARE GREATEST VALUES AT LOWEST PRICES

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The Hess line is complete for every dealer requirement, distinctively different and more saleable. Financing plan and territory plan—helps Hess dealers.

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HESS WARMING & VENTILATING CO.
1211-27 S. WESTERN AVE. Founded 1873
CHICAGO, ILLINOIS

ALMAR EASY SLITTER

This attachment eliminates necessity of an 8′ or 10′ squaring shear wherever this type of work is limited. Installed on brake in three minutes or can be used on bench. Will cut 28, 26 and 24 ga. metal easily, with neat, accurate edge. Low in price. Fully guaranteed.

Write today for literature and prices!

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564 W. Washington Blvd. Chicago, Illinois

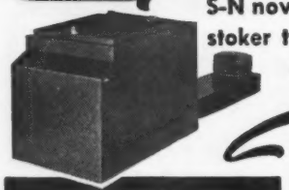
Are You Too Busy To Pick Up Money?

There's plenty of it lying around — right around your own shop. You can get it with a Super Furnace Cleaner. Out of the dirty furnaces which are all about you. Other sales and profits follow cleanings. Try it and see. Write for plan and free trial.

THE NATIONAL SUPER SERVICE COMPANY
1944 N. 13th Street Toledo, Ohio

HERE'S REAL NEWS FOR STOKER DEALERS!

S-N now offers you a 30-pound stoker to retail at $98.00 plus controls and installation.



WRITE TODAY FOR COMPLETE INFORMATION

This quality stoker has — automatic air control, continuous feed transmission, thermal overload cutout switch, shear pin, heavy sectional retort and many other features.

SCOTT-NEWCOMB, INC., 1931 Pine St., St. Louis, Mo.

MILL EXHAUSTERS

1. Designed and built by the **Pioneer** exhauster manufacturer.
2. Result of over 80 years of air engineering experience.
3. High efficiency assures low power consumption.
4. Sturdy construction assures dependable service.

Write for Catalog No. 430

B. F. STURTEVANT CO.
HydePark, Boston, Mass.
Branches in Principal Cities

Defense Developments

(*Continued from page 39*)

planned, and constructed, need not create future community burdens, but can in most places be made a valuable asset. In communities where housing surpluses may exist after the emergency, a logical and desirable means of eliminating the surplus would consist of getting rid of existing substandard dwellings rather than scrapping the defense housing.

"The difficulties attendant upon such a program are obvious. . . . They call for searching study, competent planning, and effective programming. By these means, new building during the present emergency presents an opportunity to do community replanning, to rid older sections of blight, and to insure stability for new development. . . . It should provide the means for overhauling and rejuvenating our communities and defeating obsolescence and decay."

The Committee recommended that wherever operating local housing authorities exist the responsibility for the design and construction of public defense housing projects should be delegated to them.

C. F. Palmer, Coordinator of Defense Housing, said: Some reports to us indicate it may be necessary to authorize immediately $500,000,000 more for the public construction of 125,000 homes to be used as needed through suitable appropriations from time to time. We already have the data to support these needs.

In addition, it may become necessary to urge that mortgage lending on residential construction be curtailed in non-defense areas, and that such curtailment be applied to higher-cost building even in defense areas.

Four Possibilities

The following procedures are possible:

(a) Encourage the use of substitute building materials instead of those which are essential to other phases of the defense program.

(b) When necessary, apply priorities on residential construction to give preference to defense housing needs.

(c) Utilize available machinery to obviate unreasonable advance in cost to residential construction.

(d) Expand Title VI of the National Housing Act to encourage further private building in defense areas in order to hold as nearly as possible to the present high level of privately financed construction in spite of the increasing difficulties which are anticipated.

Altogether, it now looks as if there is a minimum need for total residential construction during the fiscal year 1942 (that is July 1, 1941, to June 30, 1942) of 625,000 units. Of this number 525,000 should go into defense areas. Of the 525,000 to go into defense areas probably 125,000 should be built with Government funds, leaving 400,000 to be supplied by private industry.

◆

New York Trade School

On June 27, 1941, the New York Trade School concluded its 60th year of service to the young men of America. Fifteen students in sheet metal and air conditioning were graduated in addition to those graduating in plumbing, welding, electricity, and automobile mechanics.

The Sheet Metal and Air Conditioning students completed their high school education before coming to the New York Trade School, where they received one year of intensive training in the layout and construction of all types of sheet metal products.

That Guy's Got the *EXCLUSIVE* PREMIER Franchise

Brother, you're set to go places when you have the PREMIER Franchise. This franchise gives you *exclusive rights* to today's most *complete* line, plus today's greatest program of dealer cooperation. Get the facts TODAY about this PREMIER profit opportunity!

PREMIER FURNACE CO.
Dowagiac, Michigan

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- Automatic Fuel Burning
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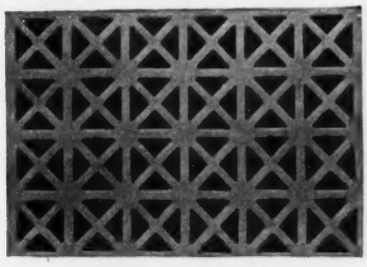
The Year Round Line

PERFORATED METALS

ORNAMENTAL DESIGNS



Light Steel Sheets for radiator enclosures, metal furniture cabinets, radio speakers, etc. We stock sheets of various thicknesses and dimensions in a variety of designs.

INDUSTRIAL PERFORATIONS

All sizes and shapes of holes in any metal. Your inquiries will receive prompt attention.

The Harrington & King PERFORATING Co.

5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

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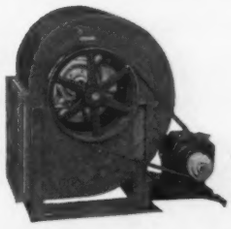
available at

Schwitzer-Cummins Company



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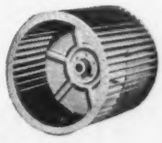
Top and Bottom Horizontal, and Top and Bottom Vertical Discharge.
Top and Bottom Motor Mounting.
Dual Units also available.



● CENTER DISC WHEEL

Double Inlet, Double Width.
Reinforced Center Disc.
Designed for Modern Air Conditioning and Heating Applications.
Sizes, 4 ½" to 50".

● SINGLE INLET WHEELS

For Oil Burner, Stoker, and Air Conditioning Applications.
Sizes, 4 ½" to 50".
Variety of Blade Lengths for each diameter.

● ENGINEERING DATA

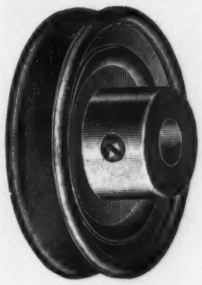
Write for Catalogues showing complete Performance Data.
Experienced Engineering Department available to help solve your Air Handling Problems.

BLOWER DIVISION
SCHWITZER-CUMMINS COMPANY
125 FAN STREET INDIANAPOLIS, U. S. A.

"They help sell our product"

. . . that's what users say about

MAUREY V-PULLEYS



Steel

Cast Iron
Variable Pitch

Cast Iron

Heating and Air Conditioning Plants, Refrigeration Units, Fans, Blowers, Stokers and similar installations MUST have dependable V-Pulleys for F. H. P. Transmission.

Manufacturers of apparatus of this kind have found that Maurey V-Pulleys installed in their units assure unfailing dependability that can be guaranteed against "break-down" caused by pulley failure.

When considering V-Pulley requirements, be sure to compare Maurey V-Pulleys with any other V-Pulleys made, for Design, Workmanship, Appearance and Performance.

Write for Circulars Describing Maurey Steel, Cast Iron, and Variable Pitch Diameter V-Pulleys.

MAUREY MANUFACTURING CORP.
Wabash at 29th Street, Chicago, Illinois

VIKING
HUMIDIFIER VALVE

The only valve with the *accessible orifice.*

Write today for new catalog and prices.

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AIR CONDITIONING CORP.
9500 Richmond Avenue, S. E., Cleveland, Ohio

SHEET METAL MACHINERY
SINCE 1880

All sizes of **Lockformer Pittsburgh Rolling Machines.** Large stocks in New York Warehouse of Sheet Metal Tools and Machines, Brakes, Square Shears, Auer Registers and Grilles, Metal Screws and Dial Regulators.

Try us for Quick Delivery. Skylight Gearing at low prices.

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★ Forced Air Furnaces
★ Evaporative Air Coolers
★ Floor Furnaces ★ Blowers
★ Circulating Heaters

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4851 S. ALAMEDA ST., LOS ANGELES, CALIFORNIA

JOHNSON
Furnace No. 118

Quick Heat at Less Cost

Heats the largest soldering coppers, branding and stenciling irons; can be used for tempering, heat-treating, annealing, case-hardening or melting soft metal. Firebox 6¼"x5x6½", heavy refractory lined. Removable lid permits using 22 lb. capacity melting pot.

Write for Prices and New Catalog.

JOHNSON GAS APPLIANCE CO. 609 E. AVE. N.W.
Cedar Rapids IOWA OUR 40TH YEAR

Arc Welding Dish Washing Machines

(Continued from page 67)

Without going into detail the productive labor for the tank by points is as follows:

Productive labor for riveted construction....441.66 points
Productive labor for welded construction.....220.35 points
Savings in productive labor.....221.31 points
Per cent savings..... 50.1%

Omitting detailed operations, the productive labor by points for the wash chamber is as follows:

Productive labor for riveted construction....310.70 points
Productive labor for welded construction....147.20 points
Savings in productive labor.....163.50 points
Percentage savings in productive labor..... 52.6%

Study of Skeleton Assembly

	Points including set-up	
	Welded	**Riveted**
Chamber	147.20	310.70
Tank	220.35	441.66
Frame	61.23	61.23
Assembly of Frame, Tank and Chamber	413.00	331.00
Totals	841.78	1,144.59
	1,114.59	
	841.78	
Saving in productive labor	302.81 points	

This represents a saving of 26.4% per assembled machine.

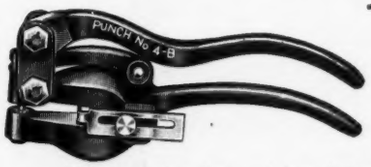
Final Results

It will be seen from the tabulaton given below that part of the savings indicated on the wash chamber in the welding operation are cancelled in the final assembly. This is due to the fact that the change in construction transfers to the final assembly certain operations which were in the case of the riveted construction performed in sub-assembly. Thus we have for the arc welded construction:

Saving on Chamber.....52.6%
Saving on Tank.....50.1%
Increase on Assembly.....24.8%
Which as shown above results in a net saving of 26.4%

Arc welding for dish washer construction, particularly for those made of 18.8 stainless steel, has very definite advantages over other methods. There is no warping or burning. Welds properly made are stronger and cleaner and clean up so that they cannot be detected from the outside. Arc welding is faster than other methods and on the whole much more satisfactory.

WHITNEY
LEVER PUNCHES



NUMBER FOUR "B" PUNCH

This punch for sheet metal work has a capacity of ¼" through 16 gauge. Weight 3 lb. Length 8½". Depth of throat 2". Complete tool includes three punches and three dies of specified sizes with die adjusting key. A time-saver for your up-to-date shop.

And here's another handy tool for the modern shop — the No. 2 Punch. Length 23". Capacity 5/16" through ¼" iron, weight 12 lbs., depth of throat 1-11/16". Punches and dies 3/32" to ½" by 1/64".

NUMBER TWO PUNCH

W. A. WHITNEY MFG. CO.
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"The Williamson Heater Company:

"Pride of ownership of quality merchandise; economy of operation due to scientific construction; beauty of good installation in the home; and the satisfaction of knowing that there are years and years of clean, healthful, inexpensive comfort to be enjoyed by the whole family when you install a Williamson 'Tripl-ife' Furnace in your home, with the automatic damper control—that is a part of the installation of every Williamson 'Tripl-ife' Furnace.

"These are some of the reasons why I say: 'If you want to go right, go Williamson Tripl-ife'."

Signed—XYZ . . . Illinois.

Complete information; name, address of writer of above letter furnished on request. Phone, wire or write The Williamson Heater Company.

FREE: Complete, easily understood short method for figuring air conditioning job. You can complete your figures, price job in one hour flat. Write Dept. No. 2. The Williamson Heater Company, Cincinnati, Ohio.

Complete Line . . . Quick Service

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WARM AIR FURNACES

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A Real SHOCK ABSORBING PILLOW BLOCK

Patented

New Type Silent Bearing for Blower Service

Unique engineering encloses bushing, cushion and oil reservoir in pressed steel ball, making compact unit streamlined to present minimum of air restriction. Built-in, oil-proof, synthetic rubber cushion absorbs vibration. Porous bronze bushing, wick-fed from large oil chamber insures lubrication for exceptionally long periods of operation. Positively self-aligning due to ball and socket action of spherical housing and mounting.

Results! Low cost, increased air delivery, utmost durability and freedom from vibration. Quotations submitted on request.

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For Roof Ventilation Jobs Where the Load Varies— Install Swartwout AIRJECTORS

You'll please your customers—with profit to yourself—when you give them this double-duty Roof Ventilator. Large capacity *power* air movement when required—free gravity flow when the need is less, at no power cost. Write today for Airjector Catalog.

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The shortest road to a profitable furnace business is in being able to make prompt repairs of old furnaces at reasonable cost. PEERLESS dealers in new furnaces have the largest stock of furnace repair parts (all makes, all ages) in the central states, at their command. Complete line of new furnaces and winter air conditioning units at popular prices. Write for dealer proposition. Also ask for Parts Catalog.

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PARKER-KALON Jiffy REGULATOR SET

SIMPLE . . . LOW COST

SAVES TIME

AND LABOR

For controlling dampers in heating, ventilating, air conditioning systems.

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Turn WING NUT

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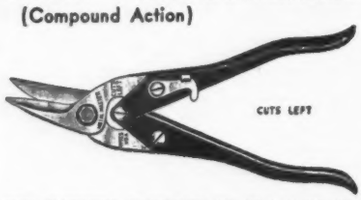

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REINER & CAMPBELL CO., Inc.

667 Norwood Terrace, Elizabeth, N. J.

Residential Warm Air Heating for Builders

(*Continued from page 62*)

ment located on the ground floor level or even in the attic. Do not forget that in either of these cases the heat loss of the floors must be considered and it usually amounts to enough to change the size of the equipment. Where heating equipment is installed in a closet be sure to provide enough air openings to furnish as many cubic feet of air per hour as 2% of the B.t.u. input. Example—100,000 B.t.u. input heater requires 2,000 cubic feet of air per hour.

Make Apparatus Accessible

Where equipment is located in the attic, please, oh please, make it readily accessible. We all know how little attention the equipment in our own home gets when it is right under our nose. We have considerable trouble teaching the public to change filters and oil the motor and blower in a forced air system located in the basement. Hide this same equipment in the attic where it is necessary to get a stepladder and crawl through a scuttle hole and see how much attention it will get. Attic duct work should be insulated with air-cell asbestos. Asbestos paper is no insulation.

I feel that I should at this point devote some time to heating systems in existing residences for the benefit of the representatives of loan companies and realtors handling such properties either for sale or rent. The majority of these houses equipped with central heating systems have the warm air type. Perhaps we should say in most cases the type is Hot Air and take it any way you like.

Heating as Necessary as Plumbing

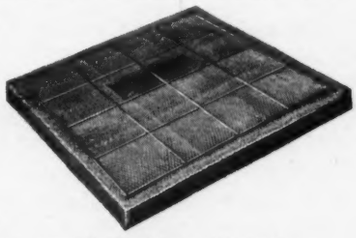
Common practice in the last few years has been to recondition repossessed houses by a complete check of the plumbing and wiring, and redecorate the house inside and out, replacing worn or defective parts but when it comes to the heating system you paint the exposed casings of the furnace black and the casing and warm air pipes and cold air return ducts white and that's that. Perhaps you don't sell the house readily so you rent it. After the tenant gets his first gas bill he howls to high heaven. I go to the residence and find an antiquated undersized coal furnace with a ring burner, undersized heat pipes, cold air return grills in an inside hall, the return duct so close to the furnace casing that the radiant heat stops circulation and frankly tell them to either clean out the basement and start over again or burn coal. If either of these are impractical they should install stoves in every room and burn the furnace at the lowest possible point to circulate

LESS SERVICE, LONGER LIFE

that's the short, sweet story of the

RESEARCH AIR FILTER

Dealers everywhere have found that they get fewer "nuisance calls" when they service with *Research Air Filters.* Research Filters last longer . . . need less frequent replacement . . . filter more efficiently.



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For full information on this ideal way to give better customer service with fewer service calls . . . write for Research Filter data sheets today!

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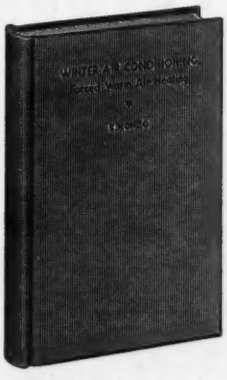

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Research Assistant Professor
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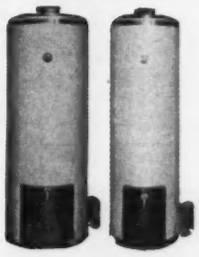

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FOR ALL HEATING UNITS

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STOVE FURNACE BOILER OIL STOVE RANGE

A. G. BRAUER SUPPLY CO.
Distributors of All Heating and Air Conditioning Equipment
2100 Washington Ave. St. Louis, Mo.

enough dry warm air to absorb the moisture created by the stoves.

Do not suppose that I assume all heating contractors are gyp artists. The great majority of heating contractors as well as general contractors are conscientious, ethical, business men, but like the dangerous 10% of the automobile drivers that cause the horrible casualty lists, we have the 10% ignorant or unscrupulous dealers that must be guarded against. My remedy for traffic conditions is for the careful drivers to turn in every screwball driver they see and residential builders must start policing their own industry if the gyp artist is to be prevented from giving an undesirable reputation to the entire building fraternity.

Separate Heating Contract Advantageous

A final word on custom built houses. Since there are no ordinances covering installation of residential heating systems the General Contractor is almost forced to use the lowest quotation he can obtain to meet his competitor. Heating specifications are in general so loosely drawn that the owner has little protection. It is my sincere belief that the heating should be separated from the general contract except for the cutting to provide passage for the air ducts and the heating contract should be let at the same time as the general contract. The heating contractor should

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VACUUM CLEANERS
5 NEW MODELS
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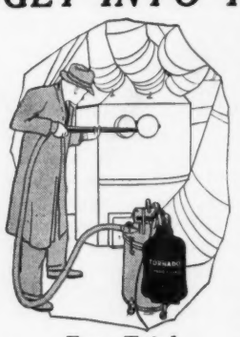

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be required to furnish the general contractor with a layout to scale. Then any changes made by heating contractor necessitating extra cutting or expense must be paid for by the heating contractor.

If it is not practical to let a separate contract, the specifications should read that the heating installation job shall comply with the particular national code covering the type of system and any deviation from the code shall be stated in the bid. Any further deviation from the code discovered within one year of completion of contract shall be corrected at the expense of the heating contractor. Any gas-fired equipment must bear the rating of the A. G. A. and the output rating must be at least equal to the heat loss of the residence plus line losses between equipment and register or radiator.

[Part 2 will follow]

◆

Save Oil by Increasing Burner Efficiency

The Oil Burner Institute, representing manufacturers of oil-burning equipment and their dealers, last week pledged to Petroleum Coordinator Ickes a campaign to save substantial amounts of heating oil in the national emergency by bringing about more efficient use of heating equipment in American homes, buildings, and factories.

By bringing up the efficiencies of existing oil-burner equipment to or above the commercial standard set by the Bureau of Standards, the Institute declared, a saving of 25 to 30 per cent in heating oil could be effected in the Atlantic coast area.—Defense, June 10, 1941.

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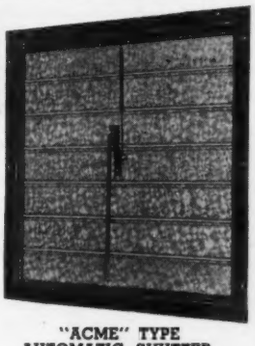

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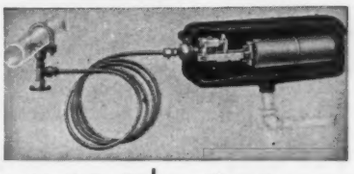

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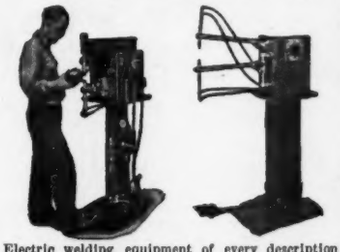
WELDING HEADQUARTERS



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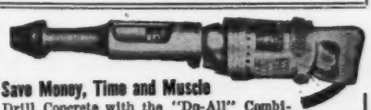

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Classified

SITUATION WANTED

Position wanted in Sales Department with furnace manufacturer or distributor. Fifty-four years of age. Successful record and can qualify for any position open. Address Key No. 540, American Artisan, 6 No. Michigan Ave., Chicago, Ill.

REPRESENTATIVES WANTED

REPRESENTATIVES WANTED: We have some territories open for aggressive agents capable of selling a well established and advertised line of Furnace Blowers to Furnace Manufacturers and Wholesale Jobbers. We have an attractive proposition to offer. Our present representatives know of this ad. Write Key No. 538, American Artisan, 6 No. Michigan Ave., Chicago, Ill.

FOR SALE

For Sale: Sheet Metal, Furnace and Roofing business, Central Indiana. Will take $4000.00 to handle this well-equipped shop. Address Key No. 539, American Artisan, 6 No. Michigan Ave., Chicago, Ill.

MISCELLANEOUS

ELECTRO TINNING—Our electro tinning containing 5% zinc is a good substitute for cadmium plating and galvanizing. It also resembles zinc and cadmium plating and is easily polished, if a bright luster is desired. We are equipped to take care of large production jobs. We will be glad to have you send us samples of your product which we will electroplate and return same promptly. Retinning Mfg. Co., 3023 Greenview Ave., Chicago, Ill. Tel. Buc. 7250.

The American Artisan Service Section presents a golden opportunity to contact a national circulation at comparatively small cost. Manufacturers can use it to make any article sell and dealers will find it an inexpensive way to contact a live buying trade. Don't delay—send in your copy now for the next issue. See bottom of page for rates.

SERVICE SECTION: Rates for display space similar to above in Service Section are $5.00 per inch per insertion. One-inch minimum space accepted. **Classified Section:** Rates for classified advertising are 5 cents for each word including heading and address. Count seven words for keyed address. Minimum $1.00 for each insertion. Cash must accompany order.

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Aldrich
ELIMINATES
FUEL UNITS
A simple pump and fuel cut-off valve — in the nozzle, where fuel cut-off should be — replaces conventional fuel units.
BY PASSED FUEL
FUEL
PUMP

Retains the VOLUMETER and MAGIC DIAL— the sensational developments of 1940

VALVE CUTAWAY

Aldrich HEAT-PAK Fuel Pump . . with lightning-fast NOZZLE VALVE Cut-Off!

Look to Aldrich to lead the industry! Now *fuel units* are eliminated — and with them go a major part of the expensive field servicing that eats up your profits! Aldrich's simple pump arrangement has fewer parts — insures new quietness, efficiency and economy of operation. It does the job of a fuel unit *better* — with none of a fuel unit's disadvantages. You'll want to know all about it. Send coupon today.

End Service Calls Due to Nozzle Trouble

★ LIQUID COOLED — circulating fuel cools the nozzle tip — retards carbon formation. Eliminates about 90% of service calls.

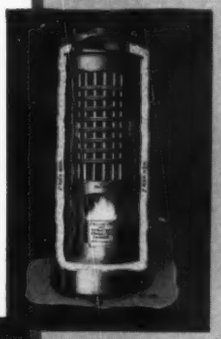
★ SIMPLICITY — Even fewer parts to wear — greater economy — less complicated servicing.

★ NO FUEL UNIT FAILURES — About 10% of service calls are due to fuel unit failure — necessitates returning unit. It costs you money. Aldrich pumps — if they ever need replacing — cost half as much as fuel units.

★ PUMP HAS NO STRAINER TO CLOG — NO VALVE TO LEAK — The simple Aldrich pump arrangement eliminates the need to return a fuel unit for costly rebuilding because of clogged strainers or leaky valves. Valve in nozzle readily accessible.

★ FABRIC TYPE FILTER STANDARD EQUIPMENT. No extras to buy. Big capacity automotive type filter supplied with each HEAT-PAK burner.

Conventional burners with any make old-style fuel unit also available.



HEAT-PAK oil burners are manufactured by a financially responsible company that guarantees its products. We manufacture also a complete line of oil-fired heating boilers and domestic hot water heaters.

"I want coupons from oil burner dealers who are interested in KEEPING their profits".

Loyd D. Aldrich

ALDRICH COMPANY
WYOMING, ILLINOIS

Rush me full information on the new HEAT-PAK Oil pump and the Aldrich oil burner and oil-fired Boiler and Water Heater line.

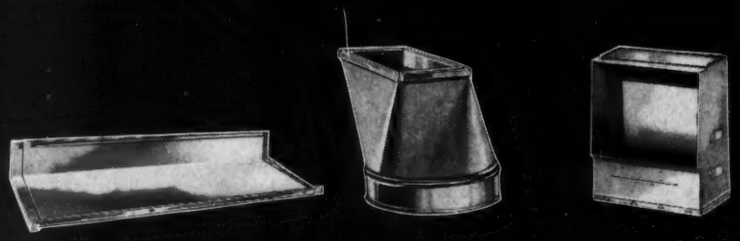
NAME_____

ADDRESS_____ STATE_____

CITY_____

ALDRICH COMPANY
WYOMING, ILLINOIS

LOCK JOINT
Single Tin Stack & Fittings
"TITELOCK" (TRADE MARK)
Double Tin Stack & Fittings



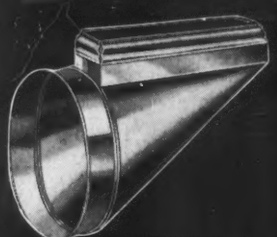
Each "LockJoint" length shipped in two pieces, completely nested, saving storage space and room on truck.

"LockJoint" Universal Boot

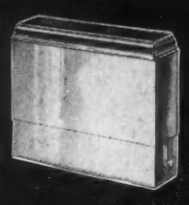
"LockJoint" First Floor Baseboard Head

Your heating jobs are easier and more profitable to handle

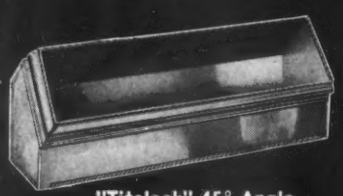
—with MILCOR Furnace Pipe and Fittings



"Titelock" Double Tin End Boot



"Titelock" Adjustable Sections
Can be adjusted to any length, 6" to 12".



"Titelock" 45° Angle

Sectional View
"Titelock" construction. "Titelock" is 1¼" deep. Shoulder guides sections together. Long runs erected without extra bracing.

Your Milcor heating jobs are fast-moving jobs — the kind you make money on. There are no "snags" to contend with, either on materials or deliveries. Exclusive Milcor construction features, plus accessories to fit every condition, cut hours from "roughing-in" time. The "LockJoint" feature, in single tin, makes tools unnecessary. You assemble it quickly by hand, both long way and end way. In the double tin, the "Titelock" fits sections together rigidly — and in a hurry. With Milcor products you get results that help win you a name for good-looking, safe, satisfactory jobs. Do as many heating shops now do — rely on Milcor's prompt service and dependable products to help you enjoy a more successful season. Check your 1941 Milcor catalog for list prices and descriptions of the line.

Write for your free copy today, if you haven't one.

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MILCOR STEEL COMPANY
MILWAUKEE, WISCONSIN CANTON, OHIO
CHICAGO, ILL. • KANSAS CITY, MO. • LA CROSSE, WIS.
• NEW YORK, N. Y. • ROCHESTER, N. Y. • BALTIMORE, MD.
Sales offices in principal cities.